Beginning 4-Part Wrap-Up
of Scraper Fundamentals page 74

March, 1961

ROADS AND STREETS

A GILLETTE PUBLICATION

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IT'S A SOUND, NO-RISK WAY OF DISCOVERING THE FASTEST, MOST EFFECTIVE AND BY FAR THE MOST INEXPENSIVE METHOD OF COMPACTING GRANULAR SOILS; BASE COURSES, FILLS AND SOIL-CEMENT MIXES.

Changing from the 13 ft., 3 inch working width to 88 inches overall for road travel or maneuverability on the job is accomplished hydraulically in just 30 SECONDS.

The new widening attachment (optional at added cost) is raised or lowered instantly. Makes the JACKSON by far the most efficient compactor for widening projects.

As one contractor on a federal highway project put it: "We rented this vibratory compactor from our dealer just for this job, but we're so pleased with its performance that we'll probably buy it. It has the versatility and punch to handle all our compacting, both big and small jobs, on slopes and level ground — QUICKLY."

VERSATILITY? Look at the illustrations. Then consider, too, that the individual compactor units may be fitted with operating handles and used as self-propelling units to compact the tight places other equipment can't touch. Also that the JACKSON operates in either direction, no deadheading or turning around is required.

PUNCH? 4200 3-TON BLOWS PER MINUTE from each of the compactor units provide extremely high productivity. 100% of specified density is frequently attained in a single pass. And the JACKSON does not leave the top 1-inch of the lift in a loose condition . . . a very important consideration. Maintenance and operational costs are extremely low.

Discover the outstanding time-and-money-saving opportunities afforded by the JACKSON MULTIPLE COMPACTOR by renting one from your Jackson Distributor. Name and further details on request.

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JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

Q: "Why don't they use a heavier-gage pipe?"

A: "Don't need to. They take advantage of Beth-Cu-Loy sheet steel's flexibility."

Drainage pipe made of Beth-Cu-Loy corrugated sheet steel does look light enough to crumple beneath the weight of passing traffic. Fact is, though, that its very thinness is the key to Beth-Cu-Loy's success in drainage structures.

Load distributed around pipe

In short, a Beth-Cu-Loy pipe has transverse flexibility which enables the pipe to enlist the aid of the surrounding material to support imposed loads. Instead of the pressure being exerted solely through the vertical axis of the pipe, it moves into, and compacts, the trench walls. In this way, the load is evenly distributed around the periphery of the pipe.

Drainage pipe made of Beth-Cu-Loy sheets is strong because it's *steel;* durable, because it has a heavy coating of corrosion-resisting zinc. It is light enough for easy installation, and flexible enough to conform to variations in grade and alignment. It conforms in every way to the specs of the AASHO.

Send for 80-page booklet

If you would like full details about Beth-Cu-Loy sheets for drainage structures, you will find just about everything you need in our 80-page Booklet 425-B, "Solving Drainage Problems." Ask your pipe fabricator for a free copy, or write direct to us.

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ROADS AND STREETS MARCH, 1961

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

Industry Affairs

19 Washington Newsletter
49 AED Distributors Ponder Profitless Competition

Contractor Management, Equipment Utilization, Job Methods

46 Central Repair Shop Sends Them Back at Dawn
50 Leap Frogging Form Crews Build 15,000 Foot Culvert
72 Dowel Holes Drilled in 8 Seconds
74 Earthmoving—Mostly About Scrapers (Beginning Series)
96 Stay-in-Place Forms Simplify Bridge Deck Reconstruction
105 Rent or Purchase? Cranes Helped Concrete Firm Grow
110 Call for Better Earthmoving Operators
115 Ripping Results Depend on the Right Teeth
117 Powder-Lance Cuts Thick Concrete Wall With Saving
122 Pointers for Long Engine Life
125 Stress Rods Tie Down Unstable Slope

Engineering, Technical, Maintenance

61 Pioneer Line Striper Retired
62 Centrally Mixed Soil-Cement Builds Up County Road
90 Ohio River Bridge Spotlights Fabricating Advances
108 Truck-Train Terminal Area Stabilized With Lime-Flyash
130 Concrete Strength Depends on Testing
138 NBCA's Quality Program "On Schedule"
147 New 165-Mile Trans-Canada Highway Link Open
150 Toward a Better Understanding of Aggregate Dryers

Departments

26 People
36 New Publications
45 Editorial (Joint Contractor-Engineer Committees at State Level)
87 Job Safety
92 Traffic Safety
104 Court Decisions
117 Meetings

Where to Buy It

150 Reader Inquiry Card
154 New Products
194 Manufacturers' Literature
196 With the Manufacturers and Distributors
183 Clearing House (Used Equipment Advertising)
198 Advertisers' Index

FRONT COVER SCENE

Sinew-testing assignment for a Gradall: ripping out and loading old concrete and asphalt topping for repaving of Wilson Mills Road, Mayfield Village near Cleveland, Ohio. Agresta Construction Company moved out 1,000 sq. ft. of 10 to 16 in. thick material per hour with this G-1000 unit, which replaced a smaller Gradall, crane-and-ball and front loader.

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription $6.00 per year ($7.00 foreign.) Form 3579 requested to be returned to Gillette Publishing Company, 22 W. Maple St., Chicago.

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Specifically designed to complete the line of BMCO self-propelled rollers, this new 18T9 boasts a ballasted weight of 18 tons with complete, independent oscillation on all 9 wheels.

Incorporating all the quality features, dependability and ease of operation of other BMCO rollers, the 18T9 is equipped with a torque converter, Revers-O-Matic transmission with four speeds forward and four reverse, power steering and power brakes.

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LUBE LOGIC Five tips to

How to return stored engines to service

In a previous issue of Lube Logic we gave you an 11-point program designed to protect gasoline and diesel engines during long idle periods. Now we'd like to finish what we started by describing the routine for taking engines *out* of storage and putting them back into action.

1 Where Texaco Rustproof Compound L has been applied to exterior of engine, remove with kerosine.

2 Remove waterproof paper and tape from all openings.

3 Remove spark plugs. Clean them and check the gap settings before replacing.

4 Remove distributor cap and clean Texaco Rustproof Compound L thoroughly from lobe of breaker cams. Replace cap.

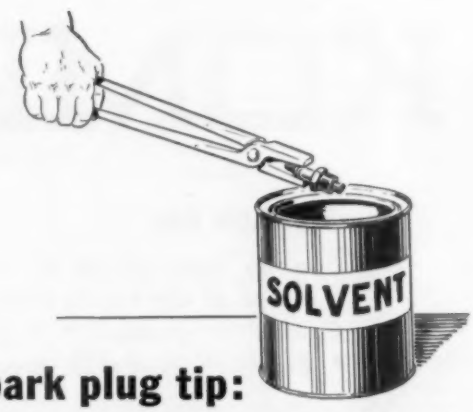
5 Check the level of the crankcase oil. If it's at the full mark, there's no need to drain the oil before operating the engine unless it requires a different grade. If the oil has fallen below the full mark during storage, drain the engine and locate the oil leak, and repair it, then refill with the proper grade of oil, before operating the engine. The first oil change after the engine is back in service should be made in half the usual period.

6 Check the cooling system for leaks, and add water or Texaco PT Anti-Freeze if necessary. It's not necessary to drain and flush if the cooling system was filled with a rust-inhibited anti-freeze before storage.

7 Fill the fuel system, start the engine, and let it run for a while. Check the oil pressure, and check for overheating and oil and fuel leaks.

End-of-shift is the best fueling time

They say there's a time and a place for everything, and for refueling equipment the best time is at the end of each day's work. And here are two reasons why. End-of-shift minimizes the possibility of fuel-tank rusting, because there's no room for condensate to form in a tank that's full of gasoline or diesel fuel. And tank-bottom sediment, stirred up by pumping in fuel, has a chance to settle down overnight, so it won't be drawn into the fuel line.

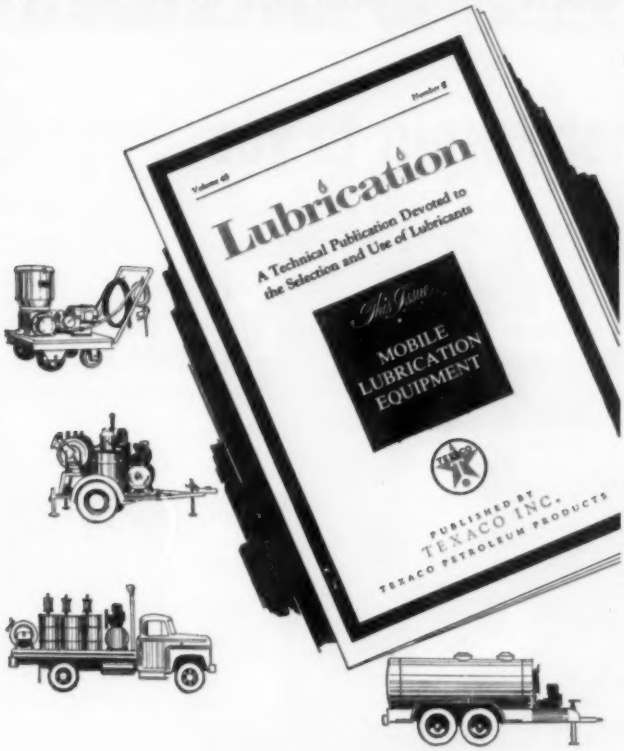


Spark plug tip: Degrease before you blast

Don't depend on your spark plug cleaner to do everything. As a matter of fact, you can actually make things worse by blasting an oil-fouled plug. Heavy oil deposits on the plug will pick up the abrasive and hold it in the recesses between the shell and the insulator. Result: burning and ultimate failure because these deposits can seriously affect the spark plug's ability to dissipate heat at high engine speeds.

Moral: degrease oil plugs in a suitable solvent and dry them *before* you blast.

prolong equipment service life

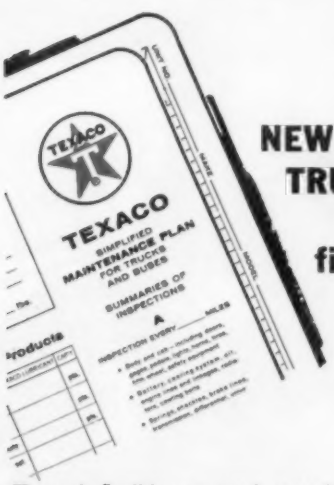

Lubrication
A Technical Publication Devoted to the Selection and Use of Lubricants
MOBILE LUBRICATION EQUIPMENT
PUBLISHED BY TEXACO INC.
TEXACO PETROLEUM PRODUCTS

The whole truth about mobile LUBE RIGS

- What good lube rigs are made of—the products and the dispensing equipment.
- How to use lube records to make your rig more valuable.
- Special purpose lube rigs.
- Pros and cons of mobile and centralized lubrication.

What does it take to make a mobile lube rig? What do you put on it? How do you use it? The questions have been coming in so fast lately that Texaco has devoted a whole issue of its magazine, *Lubrication,* to answering them: the March 1960 issue, titled "Mobile Lubrication Equipment."

Lubrication is a major factor in cost control, and lube rigs can be a major factor in thorough maintenance, so send for your free copy of the March *Lubrication*. Supply of these valuable booklets is limited, so if you want one, send in your request *now* to Texaco Inc., 135 East 42nd Street, New York 17, N.Y., Dept. R-12



NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Get yours now.

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV

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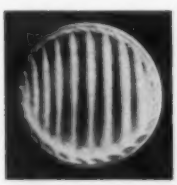

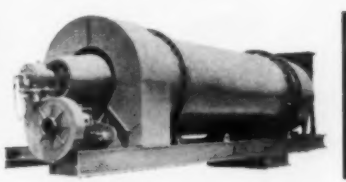

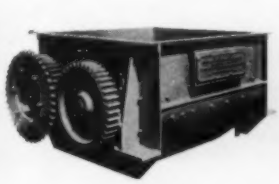

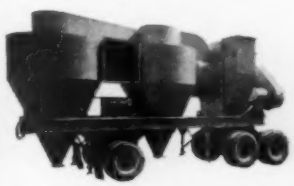

SUPER-LIFT DRYER STANDARD'S exclusive saw-tooth lifters provide maximum capacity, because more aggregate is exposed longer to the heated air. Entire dryer is self-contained unit with individual electric gearmotors (or, diesel engine power). It features positive ring gear and pinion drive, leakproof dust seals, free floating tires, and over-sized trunnions mounted in self-aligning roller bearings.

HI-SPEED MIXER Provides better and faster mixing action because more agitation is imparted to the mix within any given period of time. The STANDARD hi-speed mixer is ruggedly built of heavy welded steel, one piece construction and is fitted with patented cast alloy liners, stuffing boxes at mixer ends, heavy duty roller bearings, and many other operational cost saving features.

DUAL DUST COLLECTOR The STANDARD twin dust collecting system provides a carefully engineered and balanced induced air system. This system, in conjunction with the generously sized dryer burner furnishes maximum firing capability and efficiency on the dryer. This STANDARD packaged dust collector can be utilized either as a stationary or portable unit.

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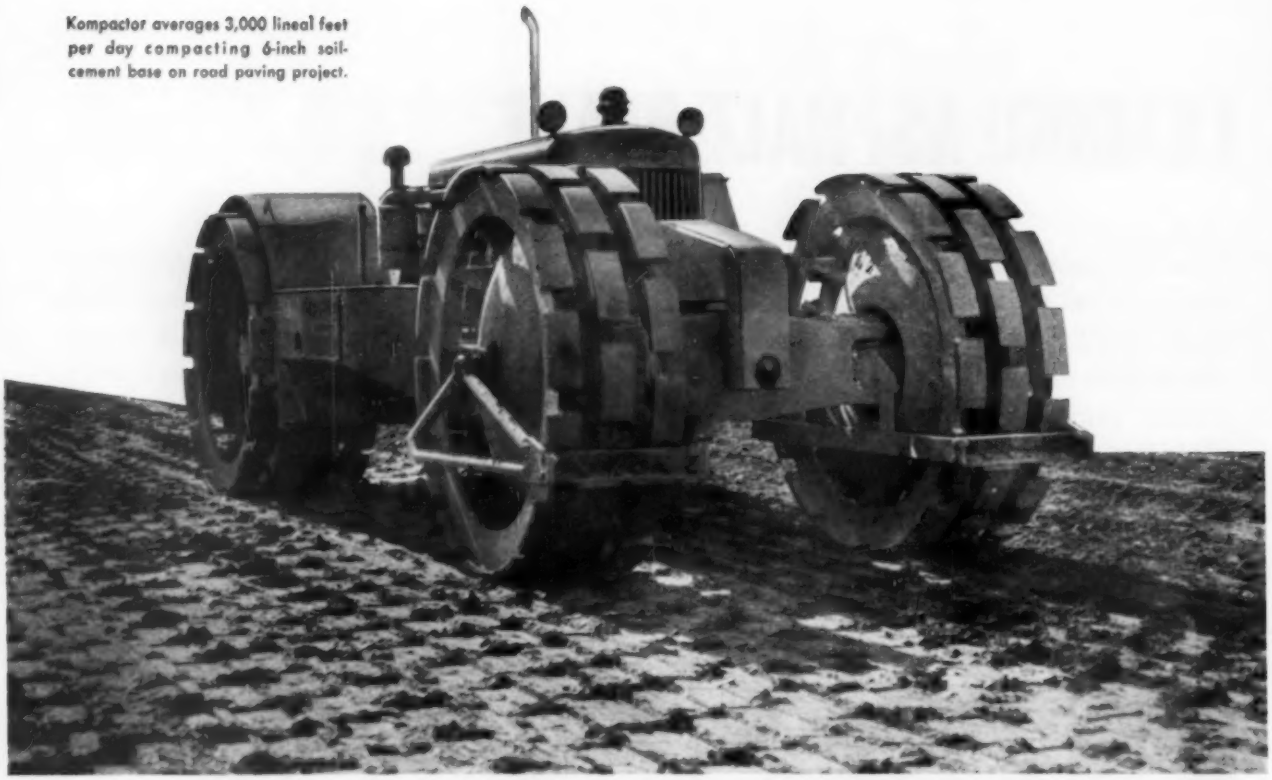
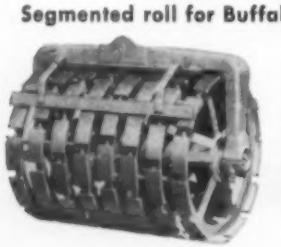
Kompactor averages 3,000 lineal feet per day compacting 6-inch soil-cement base on road paving project.



A ROLLER THAT'S JUST RIGHT FOR YOU!	Small tandems	Two-axle tandems	3-wheel rollers	
Capacities	3-5 TON TANDEM 4-6 TON PORTABLE	5- 8 TON 8-10 TON 8-12 TON 10-14 TON	10-14 TON 12-15 TON	
Type of compaction best suited for	Roll and run jobs — driveway, parking lot and playground work. Patching, light finishing.	Heavy-duty surface finishing of asphalt. Sealing off fill surfaces. Compacting granular soils.	Fine grade finishing. Handle a variety of materials in fills, subgrades, and unfinished bituminous pavements.	
Outstanding Features	Two speed mechanical transmission. Hydraulically powered towing wheels on 4 to 6 ton Portable.	Dual control. Adjustable bevel gear final drive. Single unit power train. Low maintenance.	Heavy-duty power brakes. 4-Speed transmission. Easy access to all working parts.	

Segmented roll for Buffalo-Springfield Tandem Rollers provides 3 to 7% higher compaction densities.



A quick change of guide rolls on any big Buffalo-Springfield tandem roller can give you up to 7% higher compaction densities on stabilized base materials, crushed stone, earth fills, etc. You get the special advantages of a projecting-lug roll, plus those of a smooth-faced roll in a single pass — at very low cost!

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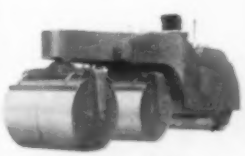
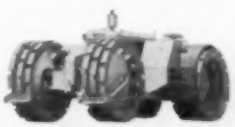
That Best Fits Your Needs

No matter how complex your problems are, you can buy with confidence from Buffalo-Springfield. Compaction is our business. Our line is most complete. And with a wealth of past experience to draw on, we can help you pinpoint the most profitable compaction piece to fit your particular needs. Talk it over with a Buffalo-Springfield man soon. Let him show you how to make your compaction dollar meet density specs in fewer passes . . . with less maintenance and downtime. Ask your Buffalo-Springfield man for complete information.

	 3-axle tandems	Vibratory roller	 Kompactor	Pneumatic Rollers
	13-20 TON	15-21 TON	K-45 . . . 16 TON	3-10 TON 10-30 TON
	Asphalt finish-rolling. Sealing fill surfaces. Compacting granular soils, stabilized base courses.	Compacting base course, surface sealing, and ideal for a large variety of granular base material compaction problems.	Handles wide variety of materials in base fill compaction, at high speed.	Heavy duty force account compaction. Compacted embankment work. All types of soil.
	Walking beam control for extra compactive effort. Hydraulic control for raising center roll.	Delivers 1500 to 2200 vpm. All vibratory effort is exerted downward for greater density in deeper lifts.	Segmented wheel roller. Works on interrupted pressure principle. Delivers higher densities in fewer passes.	All wheel oscillation. Torque converter drive. Power steering and brakes. 3-Speed transmission.

Write for bulletin on the compaction equipment of your choice or see your distributor soon.

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The most-improved light-duty models in INTERNATIONAL history!

Leading the field is the new INTERNATIONAL model C-120(4x4), 7,000 lbs. GVW. This new all-wheel-drive is practically the same height as regular models, now has single stick shift for power dividing transfer case. Shown here with unique Travelette cab, room for 6 men plus 6-ft. pickup body.

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7. Seven regular models with GVW ratings from 4,200 to 8,800 lbs. – plus the special new model C-100 – present a complete light-duty line-up.

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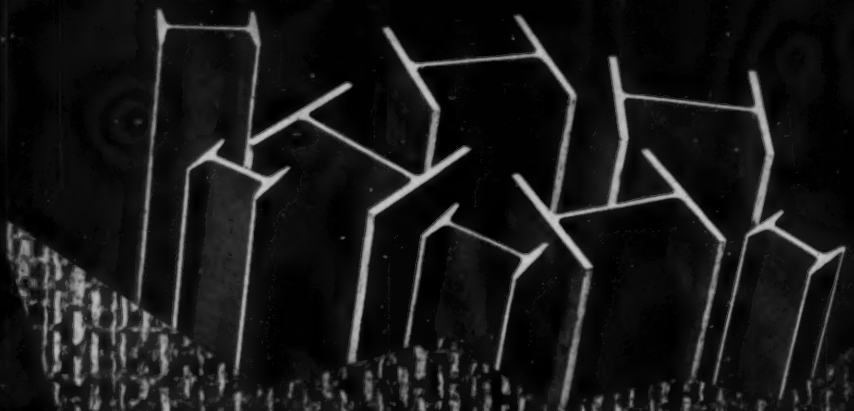
You never buy a pig in a poke

when you design highway bridges with steel.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor: Bethlehem Steel Export Corporation*



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Your fabricator can "tailor" structural steel to almost any shape, without sacrificing strength. You can adapt it to almost any architectural form.

Steel bridges last and last. Witness the Eads Bridge across the Mississippi. Completed in 1874, it's still on the job. And it has no intention of retiring.

Prefabricated in the shop, structural steel arrives at the site ready to go into place—in a hurry. No expensive, time-wasting field operations.

You always know exactly what you're getting.

BETHLEHEM STEEL

BETHLEHEM STEEL

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Job records prove Firestone's

GIANT TIRE TEAM GAINS BIG YARDAGE!

1. **Firestone Giant Tires** hold the line against downtime to widen your profit margin. Cost-cutting toughness is built into Firestone off-the-highway tires with Shock-Fortified Nylon cord and Firestone Rubber-X, the longest-wearing rubber ever used in Firestone off-the-highway tires.

2. **Firestone Giant Tire Service** is the job of experts who match the right Firestone tire to your equipment, light and heavy. These men provide 24-hour service for every tire on the project to help you meet tight schedules.

Call your Firestone Dealer or Store and get the word how Firestone's Giant Tire Team turns downtime into worktime. Or, write: Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Co., Akron, Ohio. **Always Specify Firestone Tires When Ordering New Equipment.**

Tune in Eyewitness to History every Friday evening, CBS Television Network

Firestone

BETTER RUBBER FROM START TO FINISH

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ROADS AND STREETS
Sixty-Eight years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services

March 10, 1961

President Kennedy's special highway message to Congress was the top news as this page went to press. He pleaded to put the $37 billion 20-year Interstate highway job back on schedule, on a pay-as-you-go basis. This vital program he saw to be threatened by various Congressional measures to cut gasoline taxes, transfer funds and stretch out the program.

Trucks would be taxed more heavily under the President's financing specifics designed to raise an added $900 million annually for "I" roads. The chief items proposed:

- Raise the federal gasoline tax to 4½ cents, or at least retain the present 4 cents instead of letting the tax lapse back to 3 cents next July.
- As an alternate, step up the excise tax on certain automotive products (tires, inner tubes, tread rubber).
- Also as an alternate, raise the federal tax on diesel fuel to 7 cents from 4 cents a gallon.
- Tax trucks over 26,000 lb. at $5 per 1,000 lb., in lieu of present $1.50.

Press reaction was varied, with the Christian Science Monitor headlining the Kennedy message: "Road Behemoths Face Tax Tonnage." The strongly worded proposal brought applause from contractors convened at AGC's annual convention at Boston, where the feeling following a panel discussion was that the highway climate in Washington has indeed changed from a year ago, although many pitfalls lie ahead. Political observers predict that the additional financing will finally be voted from general funds.

* * *

Contractor hopes for a good year are getting support from a strong start in state highway department awards, Bureau of Public Roads statistics indicate. The states let $229 million in January, compared with $193 million in January last year. The total January-February comparison: up 25%. Federal officials here expect this kind of activity to persist throughout the year, tempered of course by whatever Congress does to the Federal-Aid Highway Program.

State roadbuilding volume for 1961, it now appears, will hit from $4 billion to $4.3 billion. The latter would be a sound 6% over 1960.

(continued on next page)

The contract controls scheme clamped on by the Eisenhower Administration is still in effect, but it is not unlikely that the new Administration will find ways around it. Last month, for example, President Kennedy announced that the federal aid allotment scheduled for April, May and June would be made available immediately to the state highway departments. Some $724 million is involved here.

The practical effect will probably be that, in some states, contract letting schedules will be moved forward a few weeks. The development may be meaningless in others. Ups and downs of the National Highway Program have led some departments to reduce their plan inventory and they couldn't write a rash of crash contracts right now if they wanted to. However, the Administration has made it clear that a number of such short-term measures to step up highway construction may be expected.

* * *

Washington is watching the outcome of highway financing schemes in the state legislatures this spring. A great many of these bodies are convening in 1961. Gasoline tax increases are being debated, to pay for accelerated road programs or merely to match anticipated federal-aid increases. The National Highway Users Conference, which keeps a conscientious eye on such proposals, reports also that "an unusually large" number of bond programs have been drafted this year.

A review of 1960 contract awards indicates that some states have not been willing to or not able to push highway improvement programs on highways not on the federal-aid systems. In at least a dozen states, departments are putting less than 5% of their construction money into products that Uncle Sam has no responsibility for. Billions of dollars worth of improvements are needed on these roads, some of them major routes, observers say. History reveals that work on this mileage usually drops off after each acceleration of the federal-aid program. It climbs back if public pressure builds up for repairs and reconstruction.

Meanwhile, bid prices have softened again. The Highway Construction Price Index fell 1.2% during the fourth quarter of 1960, following a 2.2% increase during the preceding three months. Officials here expect a slight recovery this quarter.

* * *

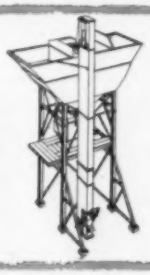
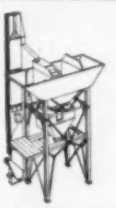
A Massachusetts Congressman has introduced a bill which would require state highway departments to request alternate bids for pavement types . . . New Jersey highway officials are calling for an annual boost of $60 million for road work . . A state master plan calls for building of 821 miles of new freeways and widening of 925 miles of existing roads by 1975.

Highway interests in West Virginia have announced they will back a proposed state income tax if half of it is earmarked for highway development. . . The Pennsylvania roadbuilding industry put its weight back of a drive for a 2 cent boost in the gasoline tax and authorization for a $300-million bond issue. Last month, the state approved both. . . State highway user tax revenues, incidentally, hit $5.3 billion nationally last year, the BPR reports, up 5% over 1959. Motor fuel taxes accounted for 65%.

The Blatnik Committee is still in business, investigating the conduct of the National Highway Program in various states. The staff has asked for $670,000 for the next two years, so it can carry on in the manner to which it has become accustomed . . . The U.S. Department of Labor has issued minimum safety and health regulations to cover employees working for contractors on federal projects. The Chamber of Commerce of the U.S. is protesting that industry was given only 30 days to review, evaluate and advise on the rules, but the agency says it won't hold up publication for recommendations.

Charge, Batch, Open the Gates on Profit with a Johnson Plant

Here are three transit-mix plants that cost little and offer a lot: easy erection, simple precision mix control; and years of service with a minimum of attention.

JUMBO 	102-cu-yd of aggregate storage in 3-compartment bin. 155-185-bbl overhead bulk cement tank. 6-cu-yd Hi-Speed Concentric Batcher with independent cement scale and hopper. 315-380-bbl-per-hr cement elevator.	The Jumbo is the largest of the low cost transit-mix plants. It offers controlled discharge of aggregate and cement through two separate levers. Cement is discharged within the aggregates to increase pre-mixing and minimize dusting. Packaged design makes erection and servicing easy. Pneumatic cement charging system available for handling bulk cement.
ECONO PLANT	45-cu-yd in 3 aggregate compartments. 58-70-bbl cement compartment. 200-240-bbl-per-hr cement elevator. 3-cu-yd concentric batcher with independent scale for cement weighing. Charging height 30½ feet.	Econoplant easily meets toughest specifications at high speed. Low charging height makes it ideal for clamshell charging. Cement is discharged within aggregates. Cement compartment comes complete with low-pressure aeration system.
ROUST ABOUT 	38-cu-yd aggregate in 3 compartments. 50-bbl cement compartment. 200-240-bbl-per-hr cement elevator. 3-cu-yd concentric batcher with independent scale for weighing cement.	Roustabout is designed for quick assembly and convenient trucking between jobs. Maximum width of largest section is 9 feet. Maximum erection lift is only 4½ tons. Entire plant can be up and working in less than a day.

J100

Johnson makes a variety of clamshell and concrete buckets, including special Lo-Slump buckets operated manually or by air. See your Johnson distributor for details.

C. S. JOHNSON CO.
Champaign, Ill. • Stockton, Calif.

A Division of KOEHRING *Company*

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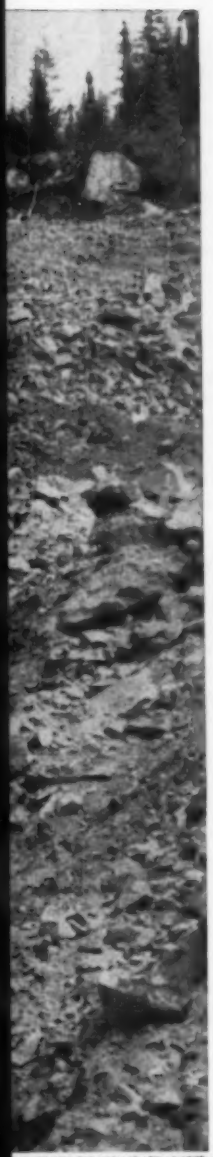
ANY WAY YOU FIGURE IT . .

GM GENERAL MOTORS EUCLID

EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE

. . "Euc" Rear-Dumps are your best investment



Reliable job-proved performance, backed by competent and well stocked dealer parts and service facilities, makes "Euc" Rear-Dumps your best bet for top production at lowest over-all cost.

There are lots of ways to compare hauling equipment but no matter what method you use there's only one real measure — reliable performance on the job.

For over 25 years Euclid Rear-Dumps have been the outstanding choice of contractors, mines, quarries and industrial users of off-highway haulers. More than half of the orders for new "Eucs" are from previous owners — repeat business that is the best evidence of customer satisfaction with the product and the service available from Euclid dealers.

With this unequalled field experience and continuous product improvement, "Eucs" give you operating advantages that cut downtime and provide greater work-ability. An experienced dealer organization with complete parts stocks and service facilities is further assurance that your "Eucs" can always be kept in top shape wherever they may be working.

You can depend on "Eucs" and your Euclid dealer for bonus benefits that don't show in the specs but are mighty important in making Euclids your best investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Euclid pioneered many of the rear-dump features that are "standard" today . . . free floating springs, planetary type final drive, exhaust heated bodies, Torqmatic Drive with torque converter and semi-automatic transmission, double acting hoist and other engineering advances that cut hauling costs.

Before You Buy Demand Facts on Spreader Performance

. . . Nothing on the market today can match the performance of the Flaherty Spread-Master!

Investigate. Ask for a factual account of performance when you look for a spreader. As a cost-conscious buyer, you can't afford any machine that can't prove its worth.

With the Flaherty Spread-Master, spreading is a continuous operation. Gravel and baffle plates assure uniform application of material, eliminate the need for drag brooms, patch trucks, or hand labor. Front and rear wheel widths are staggered to avoid wheel tracks. A much tighter and smoother surface is obtained. Large aggregates go in the oil first; fines on top. And on job after job, Spread-Master has proved savings of 20% in materials over other methods.

- Easily adjusted radial cut-off gates permit spreads from 6 inches to 13 feet.
- 13-Ft. spread hopper has ample material storage for continuous spreading.
- A 6" spread roll and full-width rod screen assure uniform flow of material.
- Receiving hopper has big capacity; 2 independently operated 20" conveyors carry material to front hopper.
- Spring-loaded truck hitch permits hooking and unhooking of aggregate trucks without stopping. Pulls trucks out of gear — cuts maintenance.
- 5 forward and reverse speeds with mid-ship shuttle gear transmission; ample power to handle tandem-axle units.

Flaherty Manufacturing, Inc. Branch
BUFFALO-SPRINGFIELD CO.
Pocatello, Idaho *A Division of* KOEHRING *Company*

F100

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EDITOR WANTED

Wanted: A civil graduate with proven ability to produce publishable articles on highway engineering, maintenance and/or construction. Five years with a state or county highway department a must.

Nation-wide travel, convention coverage, field reporting involved. Location, Chicago. Job is with ROADS AND STREETS in a rapidly expanding magazine publishing operation. Good career opportunity for a man with this combination. Tell us about yourself, including salary requirement. Address:

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Roads and Streets

Gillette Publishing Co.
A Subsidiary of
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Chicago 10, Ill.

PCA Offers Fellowships

The Portland Cement Association has made 20 fellowships to the Graduate School of Purdue University available for the 1961 summer session, starting June 19 and ending August 11. The free-grant awards will benefit qualified instructors and members of civil engineering departments with special interest in highway planning, design and portland cement concrete technology. The fellowships include payment of tuition, fees and transportation expenses, and a cash stipend of $700.

Study courses in concrete and aggregates, highway planning, and economics and pavement design, will be supplemented by a symposium conducted by outstanding authorities. Applicants should write Professor K. B. Woods, School of Engineering, Purdue University, Layfayette, Indiana.

Last Gravel Road

GRAVEL AS A ROAD surface is disappearing fast in Michigan—the last mile of this highway is being paved in 1961. This culminates a five-year program of converting 814 miles of roads to hard surfacing.

STUCK IN THE MUD?

TRY LIME!

Mixing hydrated lime into saturated, swampy clay soil.

Same subgrade 4 hours later.
Note how soil is dry and friable.

SPRING ROAD PROBLEM NUMBER 1:

After a long winter, there's the big backlog of road construction and maintenance—plus the inevitable spring breakup. Finally warm weather arrives but there is unworkable mud . . and more mud after late spring rains. Valuable construction time is being lost! How to break this common bottle-neck?

HYDRATED LIME MAY BE THE ANSWER

Why Lime? Because it-

1. Dries up wet clayey soils.
2. Cuts plasticity sharply and makes soil much more workable.
3. Aids compaction.
4. Provides a base relatively impervious to subsequent rains—less reworking.
5. Greatly increases strength due to cementing action . . . forming a firm "working table".

This adds up to:

EARLIER SPRING CONSTRUCTION (LONGER SEASON)
EXPEDITES CONSTRUCTION (LESS DELAY)

Any doubts of this? Ask any contractor who has built lime stabilized roads.

CONSIDER LIME FOR EXPOSED SUBGRADES AND RECONSTRUCTION OF WORN-OUT ROADS WHERE CLAY IS A PROBLEM . . . IT'S LOW COST TOO.

For further information and free literature—write

NATIONAL LIME ASSOCIATION

925 15TH STREET, N.W.
WASHINGTON 5, D. C.

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People

Moles Award Given to Brown, Immerman

The annual Moles Award, considered the highest honor attainable in the field of heavy construction, was given for 1961 to Herman Brown, of Houston, Texas, and Harry T. Immerman, New York City. The award, shared annually by a member and a non-member of The Moles, was presented at the organization's annual Awards Dinner, held January 25 at the Waldorf-Astoria in New York City.

The non-member award to Mr. Brown was made by Francis Donaldson of New York, himself a 1958 recipient of the same honor. Mr. Brown is founder and president of Brown & Root, Inc., one of the nation's largest builders of dams, defense plants, airfields, highways and other projects.

The member award to Immerman was given by George F. Flay, Jr., of Stock Construction Corporation. Mr. Immerman is vice president and chief engineer of Spencer, White & Prentis, heavy construction firm of New York City. He is a foremost specialist in difficult foundation work.

Presiding at the dinner was Eugene G. Rau, a Moles vice president, with the Rev. Robert I. Gannon, S. J., as speaker. The Moles is an organization of heavy construction leaders. Past recipients of their annual award include such personalities as Herbert Hoover, Robert Moses, Adm. Ben Moreel and others who have contributed outstandingly to the advancement of construction.

Kenneth Lindsay Retires

Howard Hall, President of the Iowa Manufacturing Company, Cedar Rapids, Iowa, has announced the retirement of Kenneth Lindsay, Iowa's Executive Vice President for the past twelve years. Mr. Lindsay, 70, completed 31 years of service with the Iowa firm.

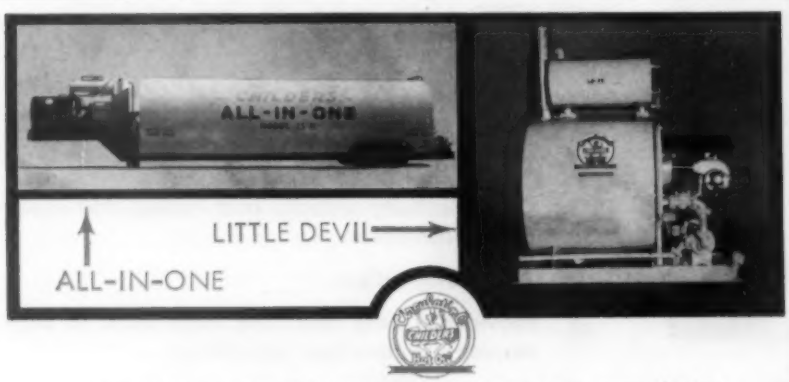
Kenneth Lindsay

Mr. Lindsay has participated actively in the major construction industry associations since their inception, serving the American Road Builders Association (ARBA) and its Manufacturers Division, The Construction Industry Manufacturers Association (CIMA). He was elected a Director of CIMA for three terms and served as a vice-president and also president. While President of CIMA, Mr. Lindsay directed the preliminary organization for the 1957 Road Show. Mr. Lindsay was active on the joint commitee on CIMA and AGC as Co-chairman for several years. He was also a Director of the International Road Federation. Recently he was named a Founder-Trustee of Better Highways Information Foundation, and also Trustee of a construction historical museum to be built on the campus of Pepperdine College in Los Angeles.

Wm. A. Bugge Heads Highway Research Board

William A. Bugge, director of the Washington State Highway Department, is 1961 chairman of the Highway Research Board, National Academy of Sciences-National Re-

Continued on page 34



Portabilize with a Childers' ALL-IN-ONE trailer mounted dual storage tank. Insulated Dryer Fuel Oil Tank and Asphalt Storage Tank, with your choice of capacities 4,000 to 25,000 gallons, are independently coiled and controlled. Heater, sized to tank capacities, mounted on gooseneck, and pumps mounted on rear platform. These units save YOU time, labor and money.

Economize with Childers' new Little Devil. This manually operated, insulated, unit has been engineered to provide a high quality heater, at a low cost, for Hot Mix Plants with capacities of 10 to 40 TPH. Fuel input, at Your control, is 2 to 6 GPH, and horsepower required is 1-¾. There is no factory installation service assistance required.

Contact your local distributor or Childers direct for details.

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SPECIFIED WORLD-WIDE AS THE PREFERRED SEALANT ON MAJOR CONSTRUCTION PROJECTS

ALLIED Jet Seal chosen for THROGS NECK

NEW YORK CITY'S NEW $90,000,000 SUSPENSION BRIDGE

Allied JET SEAL was specified as the preferred sealant for the New York Triborough Bridge and Tunnel Authority's Throgs Neck Bridge. JET SEAL—the original, two-component, polysulfide, polymer, elastomeric joint sealing compound—was used in sealing work on the approaches of the new six-lane East River crossing, connecting the Bronx and Queens.

The Queens Approach of Throgs Neck Bridge, from Pier Q2 to the anchorage deck, showing the viaduct slab being cured.

FACTS ABOUT THROGS NECK

- Long approach viaducts: Bronx side 6,000 ft. in length; Queens side 3,400 ft. in length
- 1800 ft. main span • Side spans 555 ft. in length
- Height of bridge tower: 360 ft. above water
- Under clearance: 142 ft. at mid-span, 135 ft. at the towers
- Requires 60,000 tons of steel
- 3 years to complete. Open to traffic January 11, 1961.

Construction Engineers Specify ALLIED Jet Seal Because...

- JET SEAL has no flow, even at elevated temperatures (200° F).
- JET SEAL is ideally suited for sealing vertical and overhead joints, without special preparation.
- JET SEAL will prevent penetration of water into joints.
- JET SEAL is highly resistant to highway salts.
- JET SEAL will prevent incorporation of incompressible materials.
- JET SEAL has positive adhesion, cohesion, resilience and ductility at low temperatures (—20° F).
- JET SEAL is quick curing—construction can be opened to *all* traffic within one hour.
- JET SEAL's two special Applicators (Models 8591-D and X-691-E) apply the materials in one fast continuous operation.

Designed to handle the most tedious sealing jobs, under the most severe conditions, the Allied-Stroud Applicators are the only authorized equipment for the application of Allied JET SEAL.

FOR MORE INFORMATION ABOUT Allied JET SEAL, and the ALLIED-STROUD APPLICATORS, Write to:

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Save on construction costs with the new '61 FORD TRUCKS

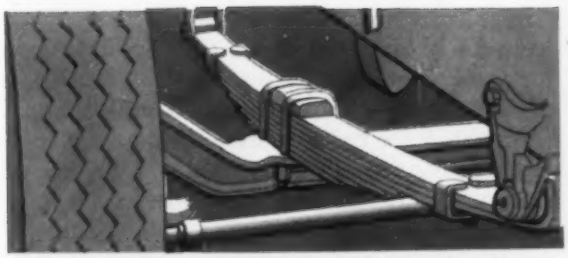
SAVE FROM $31 TO $157 ON PRICE* ALONE WITH FORD'S F-100 STYLESIDE PICKUPS

Contractors everywhere are finding that the half-ton Ford Styleside is priced below all other comparable pickups! And these rugged pickups are designed to keep right on saving with lower maintenance and operating expenses. Their durable, one-piece cab-and-box construction provides increased rigidity and eliminates a major source of rust and corrosion. Not only does the sheet metal last longer with this stronger body, but it also contributes to a quieter ride.

And you can save more . . . because you can carry more on every trip. Styleside bodies are longer and wider with loadspace increased as much as 16%. In addition, wheelbases have been lengthened 4 inches and this combined with the improved shock absorbers gives a ride that's unexcelled in its field—proven by scientific Impact-O-Graph tests. For construction work the angle of approach has been increased so you can climb steeper drives or go over deeper ditches or gullies. Ford also offers America's lowest-priced* 4 x 4 with big 8-ft. box, the F-100 Flareside.

And you can save on operating expense! Ford's Mileage Maker 223 Six is standard on all conventional pickups to keep gas costs low. The economical 292 V-8 is available for jobs requiring extra power. Both engines are equipped with Ford's Full-Flow oil filter that lets you get 4,000 miles between oil changes.

**Based on a comparison of latest available manufacturers' suggested retail delivered prices*



SAVE UP TO $250 ON FRONT TIRES! In certified tests of two-ton truck suspensions, Ford front tires lasted over twice as long. In 40,000 miles this saving can add up to $250 . . . more as the mileage increases. And Ford's sturdy I-Beam front axle and leaf-spring suspension not only cut tire wear, but their simpler design also cuts maintenance costs.

12,000 MILE OR 12 MONTH WARRANTY

SAVE WITH GREATER DURABILITY . . . on all 1961 Ford Trucks, each part, except tires and tubes, is now warranted by your dealer against defects in material and workmanship for 12 months or 12,000 miles, whichever occurs first. The warranty does not apply, of course, to normal maintenance service and to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points. Never before have you had such protection . . . such evidence of long-term economy!

SAVE WITH FORD'S NEW 262-CU. IN. "BIG SIX" ALL-TRUCK ENGINE FOR TOP PERFORMANCE AND ECONOMY

America's savingest two-tonners offer a big 262 Six with the power of big displacement, the gas economy of 6-cylinder design, plus the durability of heavy-duty construction. This engine features a sturdy stress-relieved block, strong forged steel crankshaft, long-lasting stellite-faced intake and exhaust valves, and durable pyramid-type connecting rods. And Positive Crankcase Ventilation reduces oil dilution and sludge formation to extend engine life. Ford's proven 292 V-8 and 292 HD V-8—the V-8's with "six-like" economy—are also available for your special power needs.

You also save with other new durability features like the more rugged frame, stronger radiator with new lock-seam construction, improved cab and chassis electrical wiring, plus longer, easier-riding and more durable rear springs. Ford's parallel ladder-type frame with standard 34-inch width allows you to install new or transfer your present special construction bodies quicker and for less. Also, the frame drop in the cab area lowers cab height . . . makes for easier entry.

NEWS OF MORE SAVINGS FOR HEAVY CONSTRUCTION WORK . . . ▶

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Save on construction costs with the new '61 FORD TRUCKS

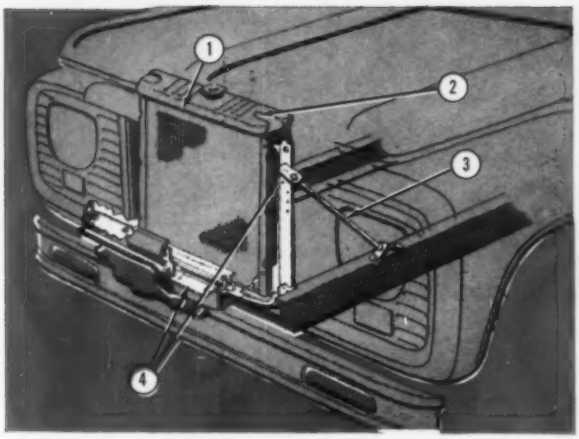
FORD HEAVIES SAVE WITH DOUBLE THE CAB, SHEET METAL AND RADIATOR LIFE

Ford F-Series Heavy Duty models are especially designed for the rugged terrain and tough conditions generally found on construction jobs. Their new independent mounting system for cab and radiator effectively separates both from adjacent sheet metal assemblies for much greater durability. And radius rod-leaf type rear springs provide better axle alignment, a smoother ride and longer spring life.

The electrical wiring system has been improved for greater reliability. Chassis wiring is fastened within the protection of the frame web, away from mud, ice and snow. And Ford Truck frames have been engineered to make the mounting of bodies and special equipment easier. A new 212-inch wheelbase model is available to accommodate extra-long bodies.

Save with Ford T-Series Heavy Duty Tandems for exceptional durability, big payloads and low operating expenses. Ford T-700, T-750 and T-800 Tandems have rugged double-channel frames that are built to take tortuous off-road treatment. And they provide a wider range of chassis options so you can choose the right power train and load-carrying components for any job. Eaton and Timken rear axles are now available in bogie assemblies with 22,000-, 28,000-, 30,000- and 34,000-lb. capacities. And lightweight aluminum walking beams, wheels and gas tanks are available to keep chassis weights low . . . payloads high.

Ask your Ford Dealer about Ford's full tandem line . . . including Super Duties with 38,000-lb. bogies for up to 51,000-lb. GVW!



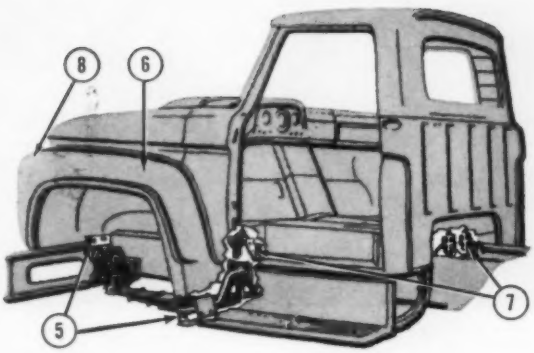
① **Save with Ford's exclusive "lock-seam" radiator construction** that doubles the solder area at key seams for greatly increased strength and longer radiator life.

② **Save with heavier-gauge metal on radiator tank and header.** Tanks and header have thicker walls to resist vibration, jolts and corrosion for greater reliability.

③ **Save with independent radiator mountings,** separate from front-end sheet metal. This means that road shocks and shakes are not transmitted to the radiator through sheet metal . . . tanks, tubes and connections last longer, require less maintenance.

④ **Save with "horse collar" mounting** for extended radiator life. This new mounting on resilient rubber at the center of frame cross member soaks up any frame flexing . . . cuts wear and tear on entire cooling system.

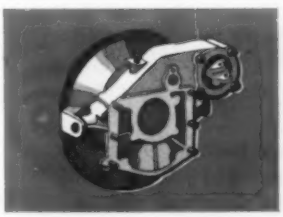
⑤ **Save with independent fender mountings.** Fenders are bolted to a rubber-cushioned transverse bracket at the front and a frame-mounted bracket at the rear. This mounting, independent of both cab and radiator, eliminates stress transfers for increased fender life.



⑥ **Save with removable fenders.** The quick and easy removal of only 8 bolts per fender provides faster service accessibility to the engine area, saving valuable maintenance time.

⑦ **Save with new 3-point cab mounting system** for greater cab durability. Two outboard front mounts plus a centered "twin" rear mount provide a triangular system that holds the cab stationary while allowing the frame to move independently . . . reducing strain on the cab.

⑧ **Save with 25% heavier-gauge sheet metal** in fenders, cab floor pan and toeboard for longer life through more strength and greater resistance to corrosion.



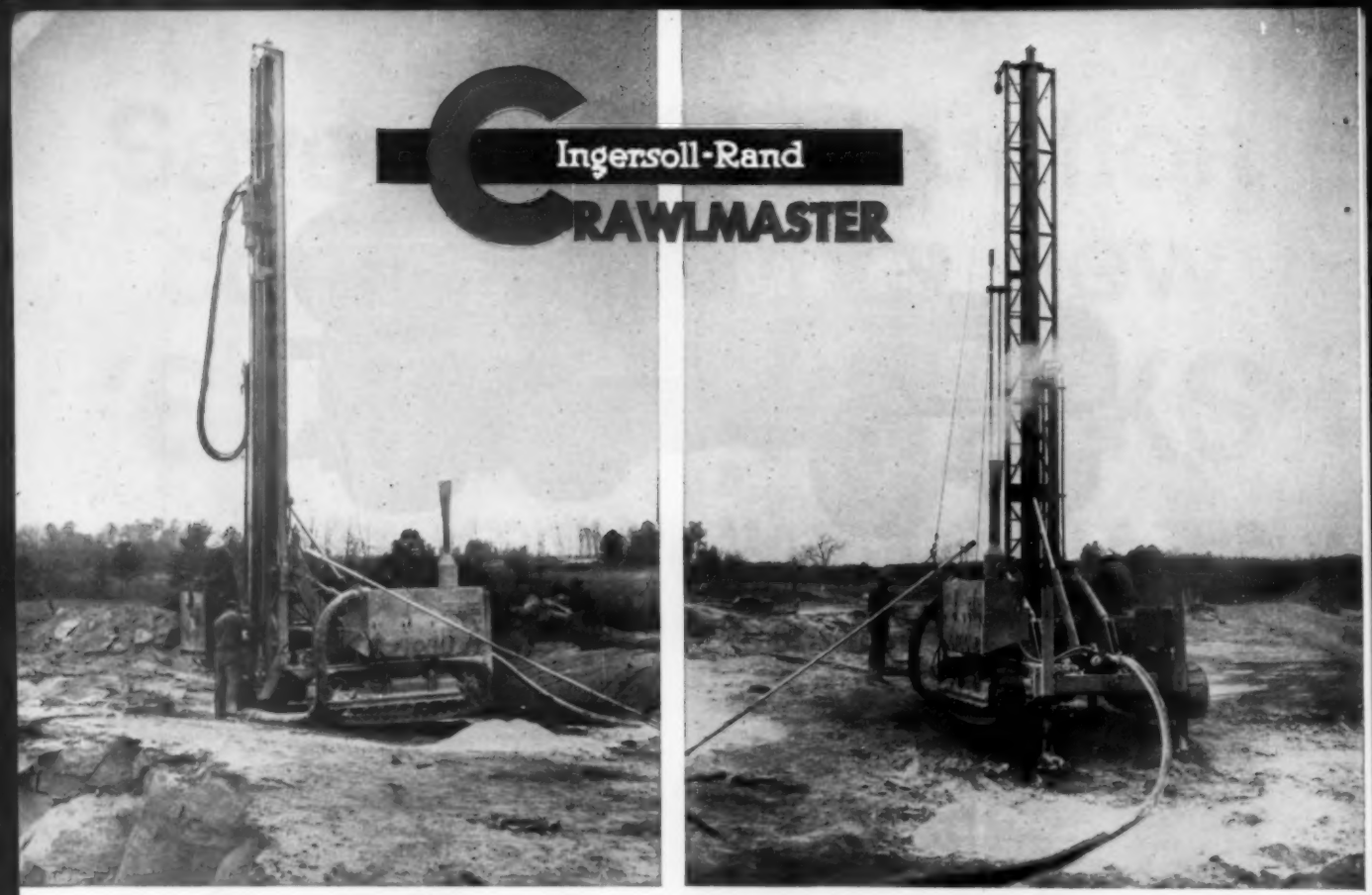
Save with Ford's new Full-Torque flywheel power take-off . . . now available on T-750's and up, to power construction equipment like transit mixers. It's much simpler and more efficient than long, complicated hookups needed with the front-end drives. And the flywheel PTO is lighter in weight—only 105 pounds—for greater payloads.

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, Ford Motor Company

... for more details circle 320 on enclosed return postal card



NEW heavy-duty crawler drill

MOST RUGGED—tons of sound design
MOST POWERFUL—outperforms 5½" drills
MOST VERSATILE—4" to 6½" holes, vertical to horizontal

The new Ingersoll-Rand Crawlmaster is a *multi-purpose machine* that meets every requirement for percussion, rotary or Downhole drilling of 4" to 6½" blast holes in any type of ground. Here are just a few of its outstanding features:

Constant-Pressure, Double-Acting Hydraulic Feed—smooth, infinitely-variable power for drilling pressure or pulling stuck steels. Drill won't jump ahead in pockets or fissures.

Simple Hydraulic Control Of All Tower Positions. Tilting of tower on yoke and raising or lowering of yoke hydraulically powered by separate cylinders. All throttles outfront for easy operation.

Throttle-Controlled Reverse Rotation permits fast uncoupling of steels without having to climb tower to reverse drill.

Ejector-Type Dust Collector has no moving parts to wear out or maintain. A simple air-jet does all the work.

Heavier—Extra weight is reflected in sound design assuring extra stamina for the toughest drilling jobs. Has rugged, tractor-type crawlers with enclosed gear drive.

Four 30" Stroke Hydraulic Leveling Jacks permit accurate tower positioning with maximum stability on rough terrain.

Hoist, Rod-Changer And Hydraulic Wrench greatly simplify addition or removal of steel sections.

Interchangeable drills and rotation units permit one machine to be used for percussion, rotary or Downhole drilling of 4" to 6½" holes, taking power from a 600 or 900 cfm portable compressor. For a new high in drilling speed and economy, ask your I-R engineer for the Drillmaster story. Or send for Bulletin 4211.

Ingersoll-Rand
33A5 ▼ 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK
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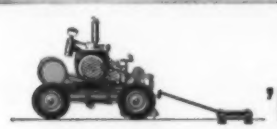
U. S. Highway No. 10 near Tappan, North Dakota. Northern Improvement Company, Contractors.



'ROUND THE CURVES—ON THE STRAIGHT-A-WAY . . .

. . . The powerful new Clipper Longitudinal Concrete Saw cuts straight and true at speeds up to 35 feet per minute, without a waver—without an operator!

Clipper manufactures the widest range of gasoline and electric powered concrete saws and diamond reinforced abrasive blades for all concrete and asphalt sawing jobs. Call your Clipper Factory Trained Representative COLLECT Today, for an on-the-job demonstration without obligation.

Sold Direct by Clipper Factory Trained Representatives from Offices and Warehouses Coast to Coast.

Clipper®

MANUFACTURING CO. KANSAS CITY 8, MO.

General Offices and Factory — 2803 Warwick — Phone GRand 1-0766

Makers of SuperMatic Masonry Saws and Blades—Diamond Core Bits and Drills

439X

FACTORIES IN ENGLAND—FRANCE—GERMANY—ITALY

Mr. Clipper

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ESSICK
VIBRATING COMPACTORS

Essick VR-28-W Self-Propelled Vibrating Compactor on Golden State Freeway

COSTS CUT IN HALF . . .
PRODUCTION TRIPLED . . .
SPECIFIED DENSITIES EXCEEDED . . .

ESSICK 28" VIBRATING COMPACTOR OUTPERFORMS OTHER EQUIPMENT ON SOIL OR ASPHALT

Charlie Brown of the Chas. T. Brown Construction Company states:
"We were working on the Golden State Freeway in Los Angeles, compacting backfill around bridge abutments and drainage pipes. At the start of the job, compaction costs were running about $1,300 per month per compaction unit which consisted of a compressor and three pneumatic tampers.

"Having successfully used Essick Vibrating Compactors on other projects, we felt that we could get better densities at less cost in the confined areas of this job with the Essick 28" self-propelled vibrating model.

"We put the Essick VR-28-W to work and cut monthly costs to about $650 per compaction unit (about one-half), tripled our production, and exceeded our best past compaction performance. Being self-propelled, the Essick 28" Vibrating Compactor is just the ticket for backfill operations on soil and in hard-to-get-at locations. It gives the most compaction at the least expense, and exceeds specifications in record time."

Many Contractors are finding that the 865 lb. VR-28-W, with its High Frequency Vibration, exceeds the compaction of a sixteen-ton static roller on soil. This multiple purpose tool has also revolutionized highway maintenance by putting down better asphalt patches at greatly reduced costs. Carrying hooks make it completely mobile, and being self-propelled, it will go just about anywhere compaction is required.

SEE YOUR ESSICK DEALER FOR A DEMONSTRATION

9 Models of Vibrating Compactors from 13" to 72" widths

Also 14 Models of Tandem Rollers from ½ to 14 Tons

ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVENUE
LOS ANGELES 21, CALIFORNIA

850 WOODRUFF LANE
ELIZABETH, NEW JERSEY

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

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Publications

Continued from page 26

search Council. Mr. Bugge, a 40-year veteran in highway engineering, is also vice president of the American Road Builders Association and chairman of the Highway Division, American Society of Civil Engineers. He is a former AASHO president.

In addition to being elected to the chairmanship of HRB at the recent annual meeting in Washington, Mr. Bugge was chosen to receive the Barlett Award, the highest honor given in the highway field. The Barlett Award is sponsored jointly by the HRB, the AASHO and ARBA.

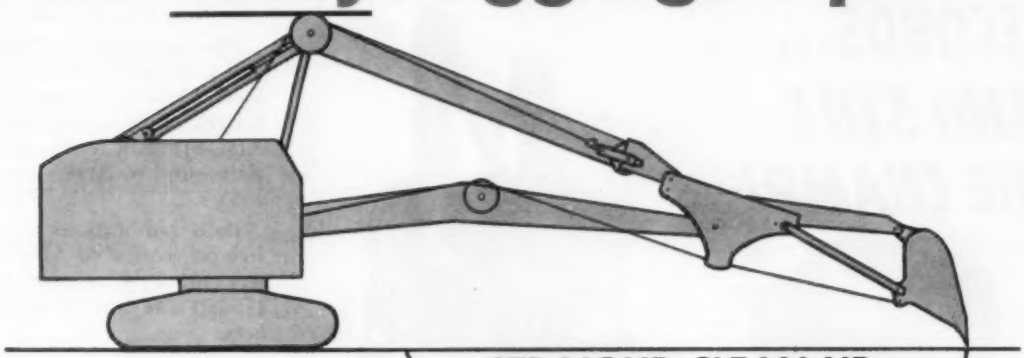
William A. Bugge

ROBERT J. MILLIGAN, district engineer, Texas highway department, Brownwood, has retired after 35 years of service with the department. E. M. Pritchard, recently assistant district engineer, has succeeded him.

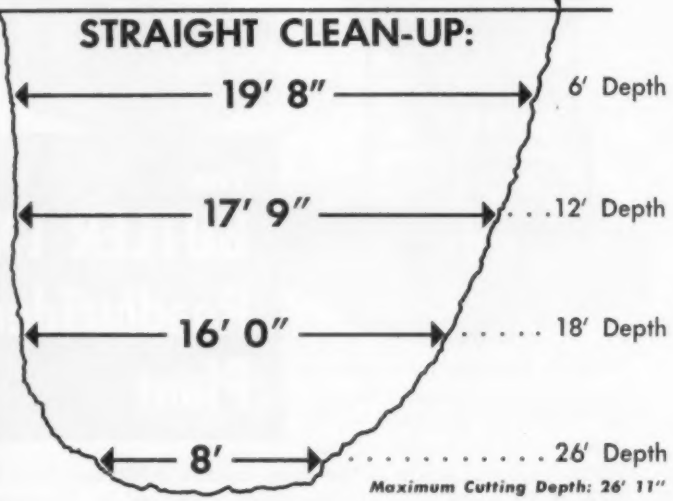
W. S. WINSLOW has been named assistant chief engineer of bridges, North Carolina state highway commission. Winslow, who replaces the late T. B. Gunter, Jr., has served the commission since 1923.

ALLEN KELLER of Allen Keller Company, Fredericksburg, Texas, has been named president of the Texas Highway-Heavy Branch, Associated General Contractors.

Longer Level Floor At Every Digging Depth



KOEHRING *MEANS* HEAVY DUTY



Koehring 405 Hoe

With a 405 you make fewer moves. Dig-dump cycles net bigger payloads. Extra long reach puts spoil bank well back beyond edge of cut. And you get 13 feet of clearance at beginning of dump for loading high-sided trucks.

The 405 carries a 1-yard dipper. Variable settings of pitch braces allow for quick adjustment of digging angle to meet all job conditions.

The 405 can be equipped as 1-yd. shovel, 1½-yd. clamshell or dragline, or 20-ton lift crane. See your Koehring distributor for complete details.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

K102

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3 SUCCESSIVE WORLD'S BATCHING RECORDS...

AND STILL THE CHAMP!

The BUTLER TX-4 Roadbuilders Plant

World's Records for highway batching were made with the BUTLER TX-4 in 1958, 6,029 lineal feet; in August, 1960, 7,250 feet; and again in the same month, 8,036 feet. All laying slab 24 ft. wide and 9 inches thick. And all by Denton Construction Co., Michigan.

That's mighty conclusive proof of the profit-making superiority of BUTLER Automation. The TX-4 can be completely actuated by the truck drivers themselves, or if required, by only one operator.

And the TX-4 is so scientifically accurate, so completely error-proof and trouble-free it *could* act as its own inspector.

Perhaps you don't need such a high-level of production. The TX-4 will exactly match your batching needs for one, two, three, four (or more) pavers. It's just a matter of the number of batchers for your contract requirements.

The Most Portable of All...

All components—bins, batchers and structural members are unitized for easy handling and transport. All wiring and piping are in place, ready for instant hook up. You'll want a complete description to know how the TX-4 will fit perfectly into your jobs, so send for the new TX-4 bulletin now — and get ready for a bigger profit this year.

BUTLER BIN COMPANY

959 Blackstone Ave. • Waukesha, Wis.

3192

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Publications

New Steel Specifications

A completely new standard steel reference, "Specification for Architecturally Exposed Steel," has been issued by the American Institute of Steel Construction, 101 Park Avenue, New York 17, New York.

Also published is "Specification and Loading Tables for Open Web Steel Joints (Longspan or L-Series). This supersedes the earlier AISC-SJI Jointly-adopted specification found in AISC's manual since 1955.

Both publications are available free on request to AISC headquarters, 101 Park Avenue, New York 17, N.Y., or any of its district offices.

Lighting Manual

Westinghouse's Lighting Handbook has been issued in a new edition. Of special interest to all concerned with highway and street lighting, it is available at price $3 on request from Westinghouse Lamp Division, Bloomfield, New Jersey.

This 250-page handbook contains a wealth of information for engineers, specifiers, highway designers, electrical contractors and others.

Bulletin on Lime in Asphalt Paving

The National Lime Association has published Bulletin 325, "Hydrated Lime in Asphalt Paving," which relates how lime improves hot asphalt mixes. In this field lime serves as a stabilizing chemical additive which not only fills voids but also imparts strength, stability and waterproofing qualities. As in soil stabilization, lime upgrades marginal pit-run materials into high quality hot mix aggregates. Generally, only small amounts (1 or 2 percent) of lime are required.

This 16-page bulletin contains numerous illustrations and test data relating to field projects in Western U.S., particularly Colorado. Single copies are available free from the National Lime Association, 925 Fifteenth St., N.W., Washington 5, D.C.

Continued on page 40

WATCH your wife bake a pie some day. If this doesn't give you a tip on road building, we'll eat it. Notice how thoroughly she blends the ingredients? She wouldn't think of rolling it until it's uniform from top to bottom. The PULVI-MIXER does this rotary blending for you, and for the same sound reason. It mixes native soil and borrow to complete uniformity —the same uniformity that allows your wife to store her pie shell at −15° and then pop it into the oven at +350° without hurting it. Does this comparison really hold for roads? Definitely. It has been proved that poorly mixed base material is subjected to uneven stresses during sharp temperature and moisture changes. The roads heave and buckle. On the other hand, Stā-Bilt Roads (that's what we call roads built by this method) have shown no such tendency, even after 15 years. But here's what adds the flavor: The Stā-Bilt method requires less equipment, time and material. It can save hundreds, even thousands, of dollars per mile of new road—enough to whet the appetite of any growing contractor. Why not get the full story from your A-M distributor, or write American-Marietta Company, Construction Equipment Division, Milwaukee 1, Wis.

AMERICAN-MARIETTA

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POWER C 'PULL'* gives you these production advantages:

TOP POWER/WT RATIO: The LeTourneau-Westinghouse C Tournapull® is powered by the GM 8V-71 diesel engine producing 290 hp. Combined with "C's" light weight, each "horse" moves only 304 lbs of total loaded weight. That's almost 93 pounds less than the average for all single-engine scrapers in this class. You accelerate 20% faster, complete cycles in less time.

EASIER OPERATION: Exclusive LW electric-control system gives you positive, *instant-response* control of steer, tailgate, apron, and bowl lift. It's the easiest-to-operate, easiest-to-maintain system of all . . . and 100% weather-proof.

FASTER LOADING: Fullpak® scraper has been proven to load a *greater* percentage of its heaped capacity than any other unit on the market. Low-angle loading, with wide entry for dirt . . . 20 yd heaped, 14 yd struck.

GREATER SAFETY: C'Pull gives you biggest brakes in the industry (3,764 sq in.), excellent visibility, and electric power steer that is never hampered by the operation of any other controls.

LOW OPERATING COSTS: You save money *every work day* because of "C's" simple, rugged design, easy accessibility of component parts, minimum of lubrication points, and low requirements for fuel, cable, oil, and tires.

More reasons why C 'Pull moves more dirt at less cost:

LW Power-Transfer Differential — automatically transfers power from slipping drive wheel to wheel on firmer footing, keeps production high on soft, slippery terrain, on slopes and curves.

Power saving features — special radiator fan needs 7 hp less than other types. Drive train is short-coupled, runs on anti-friction bearings. Electric controls use power *only* when operating.

More maneuverability — electric kingpin power steer can U-turn C Tournapull in less than its own length, for fast, easy maneuvering in tight quarters, narrow haul roads.

Interchangeability — convert from 20-yd scraper to 22-ton rear-dump hauler in a matter of hours... C prime-mover earns bigger profits.

Unequalled experience — because of the experience gained in designing, engineering and building C Tournapulls over the past 20 years, today's V-Power C 'Pull is the *most up-to-date, fully job-proved scraper on the market!*

Let us show you the V-Power C 'Pull in action. See for yourself how it can cut your costs, help you make bigger profits. See us soon.

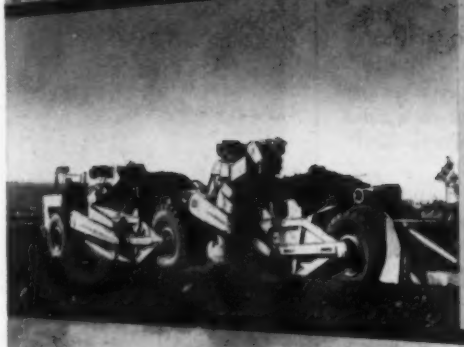
There's a 'Pull to fit every job

LW Speedpull®

For top-performance on long-haul assignments. 276 hp, 20-yd heaped capacity, 37.7-mph speeds, exclusive Hydrair® suspension, best power-to-weight ratio, many other LW advantages.

LW V-Power B 'Pull

Puts more production, new profits into big-scraper dirt-moving with: More power... 430 hp. New speed... up to 28.3 mph. New capacity... 23 yds struck, 29 yds heaped... 58 yds in tandem.



LW Tandems

With LW electric-control system you can use two scrapers behind *any* 'Pull prime-mover... double your load capacity at only 30% extra cost! Plug-in jacks, and simple swivel hitch let you add or take off second scraper in a matter of minutes.

LW D Tournapull

Money-maker on any size job with standard 9-yd LW scraper ... or with 10-yd Hancock elevating scraper (shown). 143 hp ... choice of constant-mesh or torque-converter transmission ... speeds up to 30 mph.

*Trademark CP-2370-DC-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

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Publications

Continued from page 36

Men and Motives in Safety Supervision

An effective, low-cost safety training course for industrial foremen has been developed by the National Safety Council. Written by training-expert Glenn Griffin of the University of Michigan's Bureau of Industrial Relations, the course consists of six text booklets entitled "Men and Motives in Safety Supervision," and a manual for discussion-group leaders.

Further information is available from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

CHANGING PATTERNS IN TRANSPORTATION. By Walter W. Belson, American Trucking Association, Inc., 1424 16th Street, N.W., Washington 6, D. C. A 30-page factual outline of broad interest to planners and administrative officials of road building and municipal agencies. Available free on request.

MOTOR TRUCK FACTS. 1960 edition, Automobile Manufacturers Association Inc., New Center Building, Detroit 2, Michigan. A 60-page compilation of useful data, as a reference to highway planners and others.

Among the other interesting bits of information found in this edition:

1. Motor trucks in the U.S. annually carry 240 tons of goods per family or 70 tons per person.
2. Truck registration last year reached an all time high of 11.7 million, up ½ million units in a year.
3. Special taxes on trucks total $2.7 billion annually.
4. Truck transportation gave employment last year to 7,335,000 persons or one out of every nine employed men and women in the nation.

NORTH CAROLINA'S LONG RANGE HIGHWAY NEEDS. A voluminous report has been published on this subject covering the roadbuilding needs of this state for a 15-year period and recommending approximately 1,000 individual improvement projects on the various highway systems in the state. Total price set for this job: $2.4 billion indicating the need for $33 million additional funds annually over the period.

FIELD MANUAL OF SOIL ENGINEERING. New revised edition (1960). $5.00. Michigan State Highway Department, Stephens T. Mason Building, Lansing 26, Michigan.

This 416-page Manual, the fourth published since 1940, was prepared by the Office of Testing and Research of the Michigan department. It outlines this agency's method of soil classification and mapping, and gives techniques used in design and construction of foundations for highways and bridges. The manual has found wide use in highway work outside of Michigan.

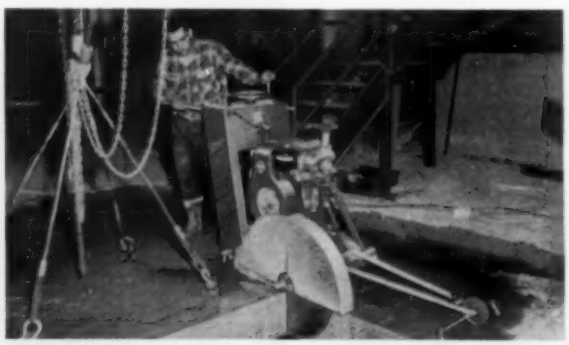
"MACHINE PLACEMENT OF WIRE MESH REINFORCEMENT IN SINGLE-LIFT CONCRETE PAVEMENT." Bulletin offered free to letterhead inquirers by the Wire Reinforcement Institute, Dept. 246, National Press Building, Washington 4, D. C. Originally published as Bulletin 246 by the American Road Builders' Association.

Written by Glenn S. Paxson, assistant state highway engineer of Oregon. Construction is described for a section of Interstate 5, on which the contractor used a special machine to place the wire fabric reinforcement in a single concrete lift. After the paver spread the 8 in. thickness of concrete, the machine vibrated and pushed the mesh down to position and also placed dowels.

One-third faster paving progress was obtained compared with placing the lower course and striking it off for placement of reinforcement.

"A GUIDE FOR PLANNING WYOMING HIGHWAYS." An engineering report prepared at the request of the state highway commission of Wyoming by the Automotive Safe-

Continued on page 42



TRUCO® DOES IT AGAIN!

Makes history by sawing 11½" thick, 5000 lb. test concrete reinforced with 2 layers of ½" rods on 8" centers. Big slab sawed out in 3½ hrs.

PROJECT: Wind tunnel at government research base. **CONTRACTOR:** Nash Drilling Co., Ltd., Montreal, P.Q. **EQUIPMENT:** Truco 18 H.P. Economy Concrete Saw; Truco Tru-Bond Diamond Blade 26" dia. 3/16" thick. **JOB:** Cut an inspection opening 10'0" x 5'0" in 5000 lb. test concrete reinforced with 2 layers of reinforcing rods ½" dia., placed on 8" centers. Slab was marked off in two 5'x5' sections, and 3" holes drilled in the four corners of each section to receive fastenings for cables to support slabs. Four cuts released the first slab for removal. There more cuts released the second slab. The 26" dia. Truco Diamond Saw made a 10½" cut and the remaining concrete on the wavy underside (about 1") easily broke away when the slab was lifted. Actual cutting time was only 3½ hours and the entire job was easily done in one day. Savings are so great Truco Diamond Drilling and Sawing Equipment may pay for itself on a single job or in a single day. Send for new Truco catalog.

MASONRY DRILLING DIVISION

WHEEL TRUEING TOOL COMPANY

1928-3200 W. Davison, Detroit 38, Mich. • 575 Langlois, Windsor, Ont.

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In just 2 months, all widening, grading, paving, curb-and-gutter work had to be completed on ⅓ mile of highway near Lansing, Mich. Milbocker & Harris brought in 3 LeTourneau-Westinghouse 9-yd D 'Pulls*, Tournatractor® and POWER-*Flow* 660 grader. The 190-hp "660" handled all right-of-way maintenance so 'Pulls could keep hauling at fastest practical speed. "Easily completed work on schedule," reports R. Milbocker.

Grading site for new shopping center, A. S. Holmes & Son, Inc. of Oakland, Calif., put *both* ends of this POWER-*Flow* 550 to work with an Ateco Ripper on the rear, and an LW bulldozer on front. Torque converter efficiently applies the machine's 145 hp to grading, ripping, backfilling. Power is *automatically* adjusted to work-load through *infinite* power-speed ratios in 4 forward speed ranges to 26.4 mph . . . 4 reverse to 23.5 mph.

THESE OWNERS AGREE, YOU GET

extra work-power with POWER Flow®

"Does a good ⅓ more work than our other-make grader." That's what Jim Smith, co-owner of Scott and Smith Construction Co., Salem, Ky., has to say about their 190-hp POWER-*Flow* 660. There's a good reason for this. With the LW *friction-free drive-train,* power loss is practically nil. You get more *thrust* at the blade . . . cut *deeper* . . . spread bigger loads *faster.* Speeds: up to 27.4 mph forward, 24.4 mph reverse.

City streets and gravel roads around Calgary, Alberta, Canada, are on work-assignment list for this 660 POWER-*Flow* grader. Here the 190-hp machine is scarifying hard-packed street prior to rebuilding. Operator W. Bellingham says, "This unit has plenty of power and very good visibility. I've been operating motor graders for about 7 years, and in my opinion, LW graders *are the best!*"

Make your next grader an LW! POWER-*Flow models: 145 and 190 hp with torque converters. Straight-shift models: 85 to 160 hp with constant-mesh transmissions. Ask for a demonstration.*

*Trademark G-2320-DCJ-1

LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

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Publications

Continued from page 40

ty Foundation, 200 Ring Building, Washington 6, D. C. An example of effective printed presentation of invaluable data on the long-range planning of a state's highway transportation facilities.

DRAWING FOR GOOD REPRODUCTION," 2nd Edition. National Association of Blueprint and Diazotype Coaters, 1925 K Street, N.W., Washington 6, D.C. Price $1.00. First published in 1958, when 40,000 copies were distributed, the 32-page treatise has been reissued with minor changes in its basic text, which stresses the importance of good draftsmanship in the preparation of technical drawings and related data and suggests techniques for improving their reproduction.

CONFERENCE ON TRANSPORTATION RESEARCH. Publication 840, National Academy of Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D.C. Price $1.00.

This report is published in response to the extraordinary interest in the transportation study conference conducted by the Council in August, 1960 in Woods Hole, Massachusetts. The report includes a summary of the entire conference plus individual chapters on transportation aspects; technology, environment, conduct of transport, need for facts, potentials for transport analyses, and education for future responsibility.

IT'S THE LAW! By Bernard Tomson, with Normal A. Coplan, Channel Press, 159 Northern Boulevard, Great Neck, New York. $7.50. Discusses the legal problems of private and public construction, answering such questions as when a contractor can withdraw a bid made in error; also matters of architect-engineer-contractor-client relationships and contracts, protection against lawsuits and damage claims from underestimating costs, and others.

REFLECTION CRACKS IN BITUMINOUS RESURFACING. By N. M. Davis. Report of investigation by the Department of Civil Engineering, University of Toronto, in cooperation with the Ontario Department of Highways under the Ontario Joint Research program. This report No. 12 (1960) includes photographic reproductions and data on results of a test installation.

CALCIUM CHLORIDE FOR CONCRETE CONSTRUCTION, a technical brief, is available free on request from the Calcium Chloride Institute, 909 Ring Building, Washington 6, D.C.

The publication is for ready-mixed concrete operators, contractors, and engineers who wish to accelerate the set of concrete, especially when outside temperatures fall below 70 F. It gives the beneficial effects of this additive, and contains charts on early compressive strength, calcium chloride with air-entrained concrete. Also it tells how to prepare and use calcium chloride in standard solution.

What gives you confidence in a company? One answer is speed. And The Fund, with offices networking the nation, is geared for prompt, accurate service, geared to deliver **all** your insurance needs, including Construction Bonds, Workmen's Compensation, Public Liability, Crime and Builder's Risk. By servicing your **total** account, The Fund can often save you money, lower your bid. Ask your insurance agent or broker to insure through **The Fund of Experience.**

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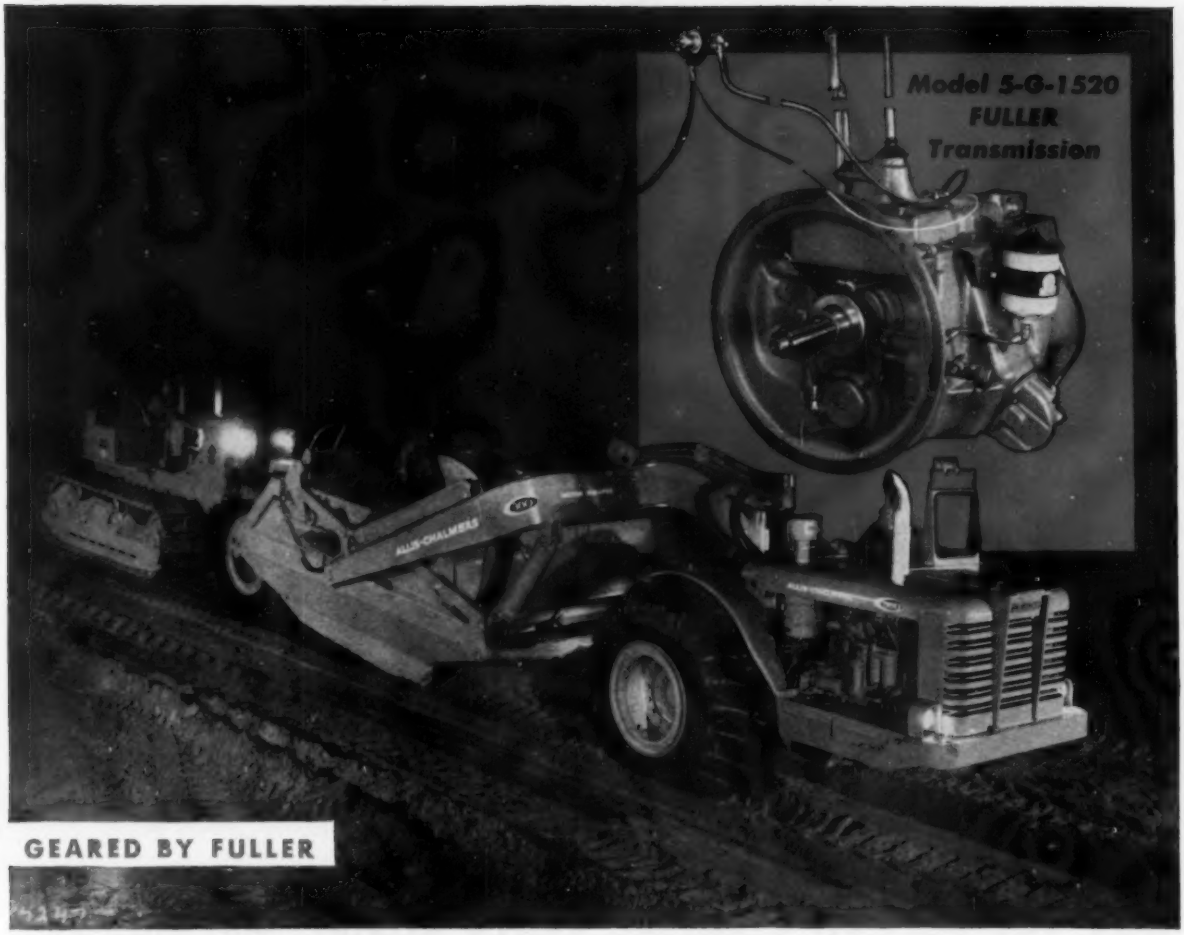

Scraper performance is important through

EVERY INCH OF THE WORK CYCLE

Allis-Chalmers' new TS-360 Motor Scraper—30 yards heaped—was designed with four major performance factors in mind: acceleration under load, sustained haul speeds, exceptional maneuverability and full-power spreading on the fill.

To achieve this performance, the 340 hp scraper is equipped with a Fuller 5-G-1520 5-speed Transmission. The heavy-duty, constant-mesh, spur-gear transmission features the Fuller Air-Actuated Countershaft Inertia Brake, which permits quick, easy up-shifts without double-clutching. Activated simply by pushing a button, the countershaft brake helps maintain momentum during shifts for maximum acceleration and sustained speed throughout the entire work cycle.

The 5-G-1520 is also equipped with the Fuller Pressure Lubrication and Filtration System which keeps gear oil clean, provides longer gear and bearing life and higher equipment availability.

Ask your equipment dealer about the Fuller Transmission designed to get more work from *your* equipment, put more profit in *your* operation.

FULLER TRANSMISSION DIVISION

EATON MANUFACTURING COMPANY

KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

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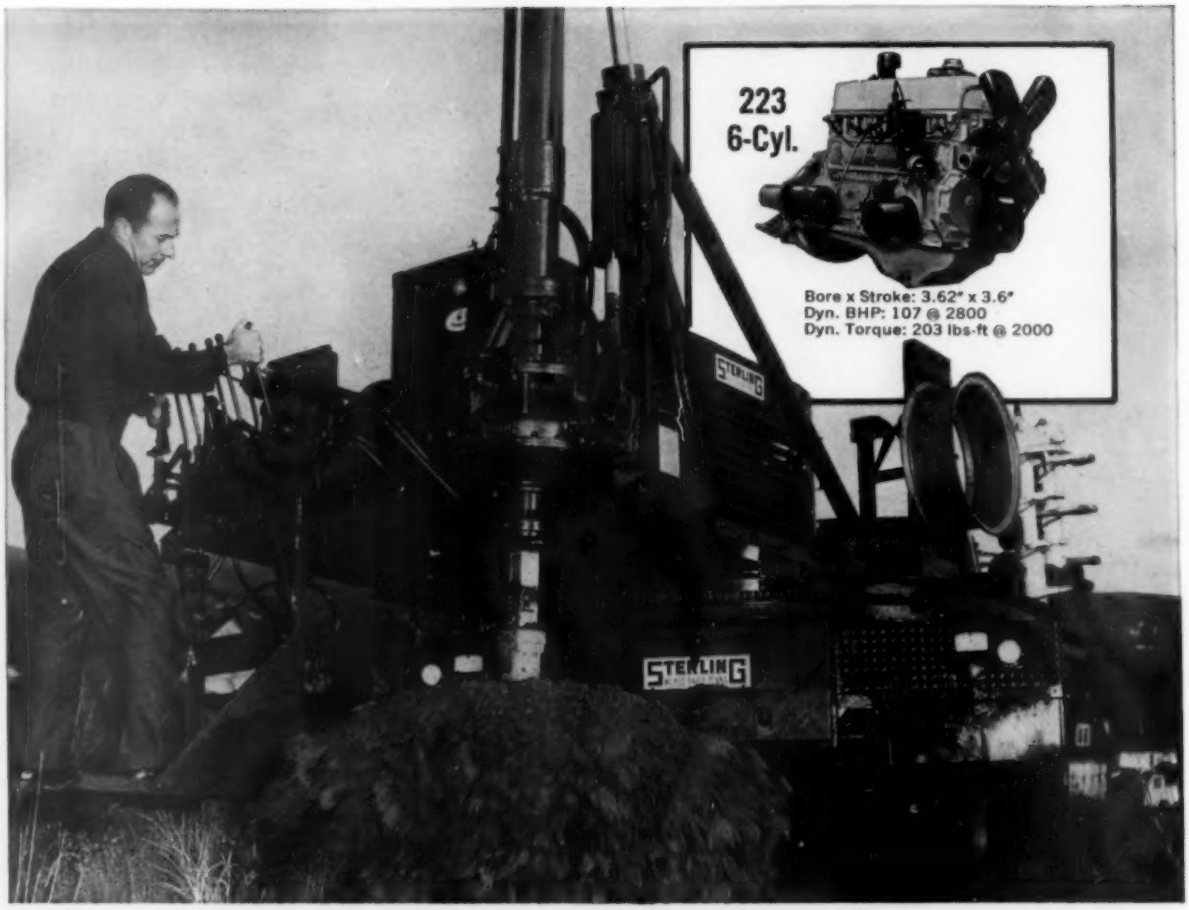

WHY THE RUGGED STERLING EARTH BORING MACHINE IS POWERED BY A FORD INDUSTRIAL ENGINE . . .

Sterling Engineering & Manufacturing Company uses the dependable Ford 223 6-cylinder Industrial Engine in its earth boring machines, because at low rpm's, this engine easily delivers the high torque needed for tough digging operations. The rugged, yet precision-engineered features of Sterling Diggers have won for them world-wide acceptance by telephone and power companies, electric and pole line contractors, and road and guard rail contractors. According to Sterling . . . "Where digging is the hardest, Ford Industrial Engines pay off as power performers where performance really counts!

"Ford engines' low maintenance, economical operation, and ready availability of parts are a major factor in Sterling Diggers' universal glowing performance reports." And no wonder, for Ford Parts availability means a minimum of downtime for Sterling's customers.

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Low-priced, quality-controlled Ford Parts are as near as your Ford Dealer. You get red-carpet service *when* it's needed! Most engines are available as foot- or skid-mounted power units . . . open or closed models. Call or see us today!

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Editorial

Joint Contractor-Engineer Committees at State Level

The recent criticism of the way the highway program is run makes it all the more necessary that contractors and engineers work closely together toward a common goal. That goal of course is good construction efficiently and economically performed.

This goal can be realized, day by day, on thousands of road jobs, only when the contractors and the engineers see eye to eye, or at least understand each other and know each other's problems. In this important area of management we can think of no effort more far-reaching than the work of the joint committees. The AASHO-AGC Joint Cooperative Committee, in particular, has performed a service almost beyond measurement. By methodically tackling a score or more of mutual problem areas, from specifications to payment practices, this body has taken many bugs out of the road building procedure. The public is getting a better shake for the tax dollar as a result.

While the work of this national committee is important, similar committees in the states could often be of equal or greater value. Some of the contractor chapters have proved this, by working with state highway people on a whole succession of matters. Local groups have the advantage of being able to meet more often, and of getting at problems closer home. Even more valuable than this or that decision on a specification change or such, is the better mutual understanding that can result.

Of all the matters that need further threshing out between AGC leaders and highway departments, specifications continue to top the list. Some states are still adhering to job requirements that are causing literally millions in unnecessary construction cost. For example, one state, according to a responsible observer, has an asphalt rolling specification that slows up the job and adds probably a dollar and a half per square yard to the contractor's bid price for heavy duty pavements.

Specification writers have overhauled the "book" in a good many states. California's new 1960 Standard Specifications is an outstanding example. Other state highway departments are still dragging their feet. Much credit is due to the Bureau of Public Roads for continually spotlighting this lag.

When a state's new Standard Specification book really rings the bell, you'll find behind it a history of months of committee work, with contractors and also equipment and material suppliers participating.

With the fast pace in technical developments tightening up on workmanship in the highway program, and the continued scrutiny of costs, joint contractor-engineer committees have a continuing job to do. The AGC leaders spotlighted this need at their mid-year board meeting some months ago in Phoenix. It is good to know that state-level liaison was being discussed again at AGC's annual convention, which convened at Boston late in February while this issue was on the press.

Harold J. McKeever

Built-up and hardfaced tractor rollers, seen in Hendrickson's welding shop area. The company's policy is to invest heavily in this type of renovation.

Central Repair Shop Sends Them Back Out at Dawn

An example of an eastern contracting firm which has adhered to the policy of central equipment renovating is Hendrickson Bros., Inc., of Valley Stream (L.I.), New York. This firm at any given time will likely have twenty to thirty-five different jobs going, in size from $100,000 to $6 million or more—expressways, sewers, local streets, overpasses and other heavy engineering projects. For this grist of metropolitan-area work the company keeps up a fleet of some 60 trucks, truck-tractors and pickups and upwards of 200 other major equipment units. The shop and yard at Valley Stream, here pictured and briefly described, is the mechanical home base for this outfit. Here the Hendrickson reputation

An engine repair job in progress in the Hendrickson main shop. Most diesel engine overhauls go to outside shops.

Parts Clerk Lin Weiser with his Kardex file and factory catalogs. The mechanical history of every machine is on record for quick management review.

of good equipment care is kept alive.

The Hendrickson shop facilities are located in a suburban area convenient to arterial highways and to rail haul although not directly on a rail line. The layout reflects the firm's gradual growth, the buildings being partly old and partly new. Hendrickson Bros., Inc., is a classic example of a family firm, founded over 50 years ago by John C. Hendrickson and operated today by his grandchildren as principals. Among its permanent employes the company is proud to have a good many veterans. The policy of a nearly complete self-contained mechanical care not only insures good equipment performance and minimizing of field breakdowns, but it also helps even out the employe work load on a year-around basis. The increasing amount of winter-time construction activity, compared with old days, also helps even the work load. And this explains the fact that the shop work while heaviest in winter is also an all-year operation.

The company stays chiefly within its suburban region in seeking work: job planning is typically in terms of a continual trailer-shuttle in and out with equipment needed for the work. Seven heavy-duty lowboys and numerous pickups and light trucks help keep equipment, parts and supplies moving between the home shop and the jobs.

Some of the aspects of the shop will be commented on briefly:

1. General procedure. The night shift often has the heaviest work load, since many machines are brought in from projects at the end of the working day, for quick fixing. Every effort is made to get machines ready to roll by morning, even if an engine must be changed or a heavy repair is involved. The night shift starts at 4 pm and runs to 12:30 at night. The day shift begins at 7 a.m. Only in unusual emergencies is any work done in the late night hours.

Trailer scheduling is closely controlled to meet this tight handling. The firm's seven heavy trailers, chiefly Rogers units, will get started at 4 am when necessary and are kept in action with changes of drivers until dark when necessary.

How much should be invested in parts, accessories and supplies? Hendrickson's answer is a limited stock kept continually replenished. Note neat bins, with lot numbers for quick location.

2. Engines are not overhauled, as a rule, but are sent either to the distributor or to one of several local shops. Cummins engines are overhauled through this manufacturer's excellent metropolitan-area facilities; International engines by the area distributor, etc. Spare engines, new or rebuilt, are kept on hand for certain equipment types and models.

3. Tires for off-road equipment and trucks are kept in a cool, clean, dry shop area set off for this purpose. A truck fitted with crane rail and hoist chain brings big tires to and from the job and does yard handling. Certain sized tires are kept mounted and ready for use as replacements. Cuts are repaired in

Continued on page 132

Hendrickson shop men store cable this way. Master Mechanic Clifford Smith is demonstrating the shop cutter, which insures neat cut-offs and saves valuable rope footage.

One of Hendrickson's 2,000 or more tires in service any given time on the company's equipment.

1960, Ugh! 1961, Better?

AED Distributors Ponder Profitless Competition

"Profitless business" may no have been the formal them at the Associated Equipment Distributor's annual convention at Los Angeles, but it was on the program aplenty. At this 42nd annual get-together of AED, held February 5-9, several speakers sought answers to the members' tough current business problems. Contractor association representatives, as well as manufacturing leaders, also took part in the program, which drew 3,000 delegates and visitors.

Keynoter in this convention's atmosphere of self-appraisal was retiring president H. J. Mayer, of Western Machinery Company, San Francisco. Mayer sees a "Soaring 60s" ahead but some continued rough going before the decade gets steam up. "As for the past year," he said in his introductory remarks, "it was the most hectic, frustrating and unprofitable year experienced for some time by distributors and manufacturers of construction equipment. Yet, overall construction contract awards in 1960 set an all-time record. This indicates that most of our problems have been of our own making. We have allowed the ogre of over-supply to cause a good many people to panic."

As a result, noted this speaker, both distributors and manufacturers have resorted to practices that they knew were not good for the industry—nor profitable for themselves. "They did it, however, feeling the practices were necessary to be competitive in a market that was getting rougher every day. The businesses were allowed to run management, instead of sound management running the business."

Looking ahead Mayer forecast a 4 percent rise in overall construction for 1961. "This is heartening. However, we are in for another year of intensified competition due to excess industry capacity. Thus, it is up to us to determine how profitable this business will be."

Looking beyond the present business dip, Mr. Mayer said, "This decade promises substantial rewards. But, they are going to have to be deserved, which means careful operation on the part of both dealers and manufacturers. Profits are not going to be handed to us on a platter by a rousing boom. If our problems are not solved, our industry will continue to deteriorate, to the point where very few of us will either desire or be able to afford to continue our businesses. I believe that we, as individuals and as a group, are too smart to allow this to happen to us."

The distribution function for construction equipment and supplies, this speaker reminded, will always be necessary to the well-being of our industry—and our industry will always be necessary to the well being of our national economy. "Therefore, distributors will survive. Not all, perhaps, but certainly those who become stronger by more efficient organization and better operating procedures."

Mayer listed some of the practices that are keeping dealer profits at low ebb:

"First, we are not helping a customer by over-selling him and granting him over-liberal terms. This only encourages him to take on commitments that he is unable to satisfy, because of lack of financial stability or lack of experience and know-how in an activity in which he has become interested.

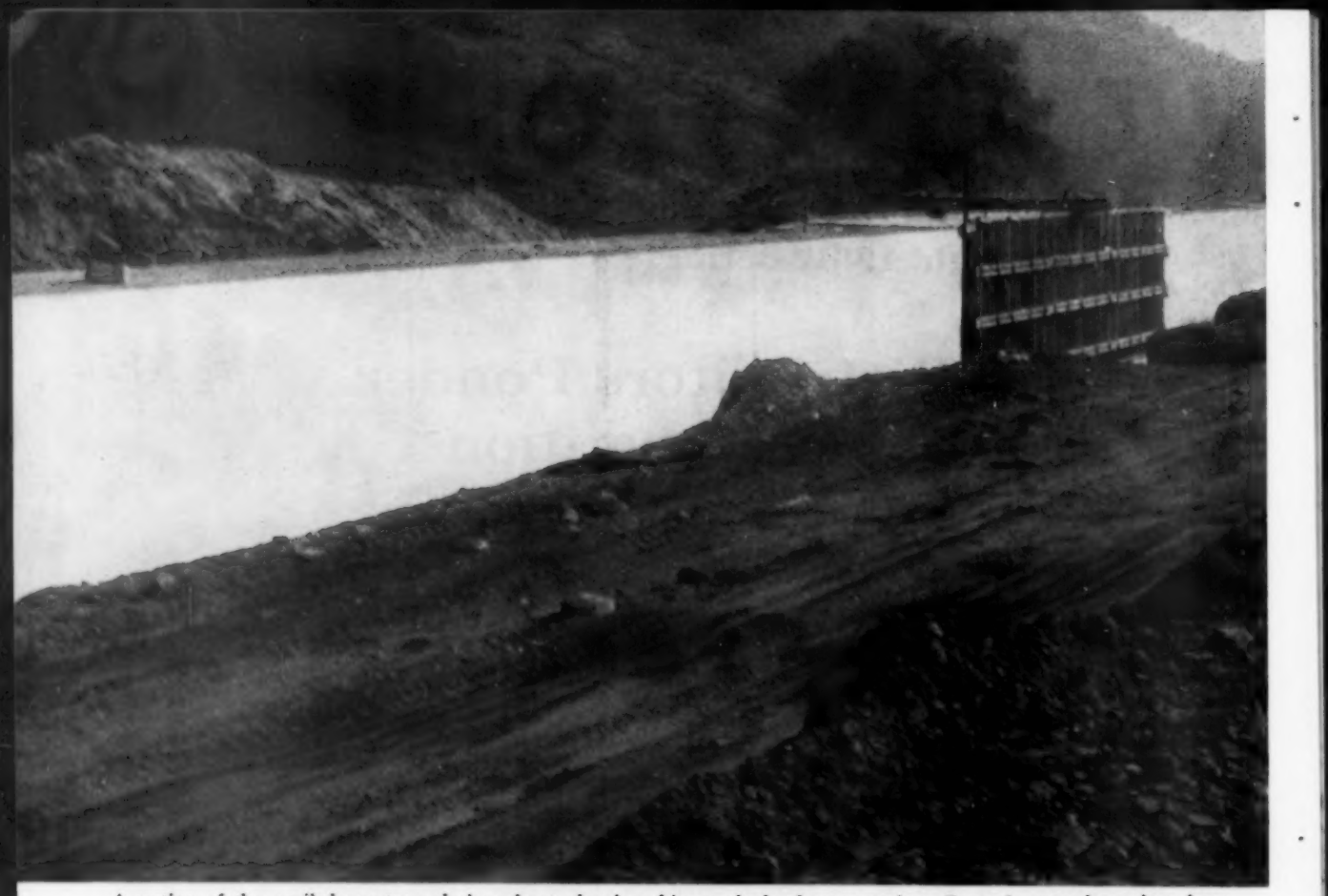
"Also, a manufacturer is doing a real disservice to his distributor in requesting or encouraging him to offer equipment on terms or at a price which will not return the distributor a realistic profit. I deplore the practice of a manufacturer having more than one price. In my opinion this kind of practice sets up a chain reaction where all competing manufacturers involved in possible sale "follow suit" and the competition for the order becomes vicious. Such action, I feel can only result in further deterioration of the overall price structure, with no actual profit for anyone.

"The buyer of the equipment learns to expect preferred prices and/or terms on all future business. He even incorporates these lower-than-normal or unrealistic equipment costs into his work bids, which in turn causes deterioration of his own industry.

"Contractors today are bidding work at low figures that do not incorporate the proper costs for equipment amortization and maintenance. This is certainly harmful, and we distributors and our manufacturers should see to it that we stop contributing to this unhappy situation."

Mayer urged distributors to work together on a sound basis toward

Continued on page 120



A section of the 3-mile-long storm drain culvert, showing skip method of construction. Formed areas have just been stripped, inner forms being rolled through the culvert on casters to sections in the background being readied for re-setting.

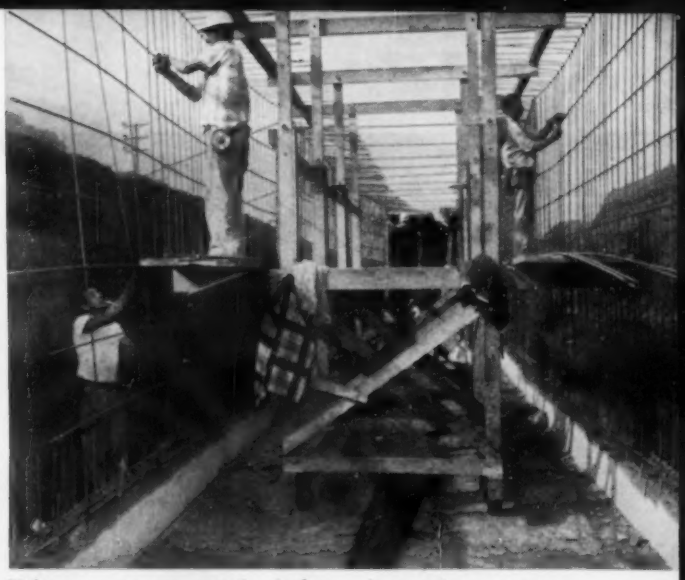
Leap-Frogging Form Crews Build 15,000 Foot Culvert

A "rabbit trap" invert form, caster-mounted box forms, and a "hot" pour is stepping up construction of a gigantic box culvert on the San Diego Freeway in southern California. The reinforced concrete storm drain is part of Guy Atkinson's contract for a freeway leg through the Santa Monica mountains.

The 15,000 ft. long storm drain ranges in size from 8′ x 10′ to 10′ x 12′ with walls up to 19 in. and bottom and roof to 21 in. thick. Getting the big drain built on time is a controlling factor in the progress of the rest of the job which will include, at 13 million cu. yd., the world's largest highway cut. To keep the culvert moving along on—or ahead of—schedule, Atkinson's crew came up with a set of durable re-usable prefabricated forms that are remarkably easy and fast setting to accurate position, easy to handle and strip, and requiring a minimum of parts.

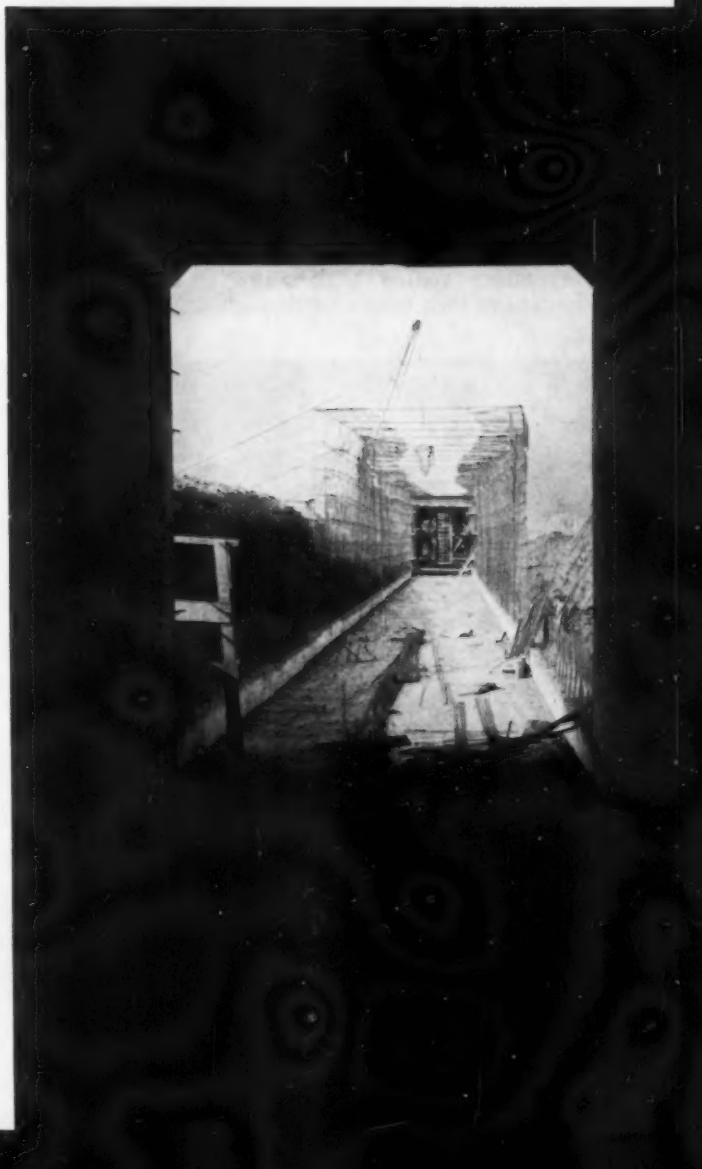
The box culvert drops down the Sepulveda Canyon, moving from an elevation of 935 ft. at the top to 566 ft. at the bottom three miles to the south. Construction through the narrow, steep canyon is complicated by the fact that the present four-lane Sepulveda Canyon road is crammed with high-speed traffic day and night. The route of the freeway and that of the relocated Sepulveda road (which will serve as a freeway frontage road) require the completion of the culvert before much can be done on the new freeway through the Canyon and the big cut.

Because of the routing of the culvert (it cuts into and crosses Sepulveda Canyon road in several places), plus the fact that the existing road will be relocated over the culvert in many places before work on the freeway roadway can begin,



Using a caster-mounted platform, ironworkers prepare the reinforcing steel cage. Racks on the scaffold hold reinforcing steel, simplifying handling and erection.

Showing the "skip" method for the 3-mile box. Reinforcing going up for a 50-ft. section while a 50-ft. panel (in background) is being poured.



any construction sequence on the culvert could provide little flexibility.

Atkinson's answer to the problem is three 150-ft. headings of forms, each made up of three 50-ft. forms comprised of three 16'8" sections. Thus, form work (setting, pouring, stripping) in the 50-ft. modules permitted by California's Division of Highways could progress simultaneously in nine different locations on three general sections of culvert route.

By breaking each 50 ft. form into three identical sections at 16'8" Atkinson came up with units that —caster-mounted—could be moved easily by the form crew and would make a smooth arc when the culvert turned.

The overall plan of attack was to cast the invert —the bottom slab and integral 12 in. starter wall—

(Left): To adjust heighth of form a ¾ in. carriage bolt is loosened. A slot in a supporting angle iron provides 6 in. of vertical movement. (Center): Knee brace design (whence name "rabbit trap"). When braces are knocked free from the notch, 2 x 6s supporting the 3 x 12 starter wall form is free to swing inward, away from wall. (Right): With the knee braces loosened and knocked from the seats, the inner starter wall form is pried away. The entire form remains intact for quick re-setting.

then roll caster-mounted inner forms from station to station. Screw jacks are used to accurately plumb and rigidly suport these deck and side wall form units during each pour. By using the skip method, a bare minimum of forms could be kept busy by rolling the three 16′8″ sections of each form unit through the box from station to station while a truck crane was used to move the 16′8″ exterior form panels.

In practice this called for something new in forms. First, the matter of the fast and accurate forming of the invert—the slab and its 12 in. starter wall—was solved with an ingenious device commonly referred to by Atkinson personnel as "the rabbit trap."

It gains this name from its most distinct attraction—a 3″ x 12″ starter wall form which, when pivoted into position, is accurately secured with 2 x 4 knee braces that are held

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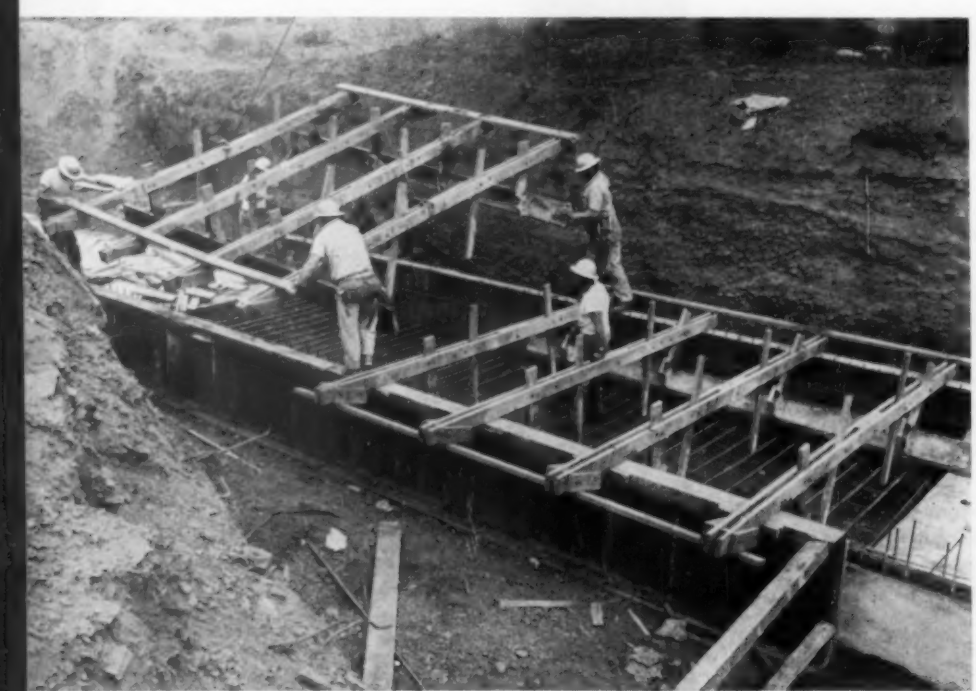


With the outside of the starter wall forms in place, a 16′8″ section of the "rabbit trap" invert forms are settled over the reinforcing mesh.

CATERPILLAR REPORTS

On the following pages:

Two Operators Try the New 630 and 631

How a $2,000,000 Business Started with 4 Used Rigs

The "New" Wheel Loaders That Are Actually 7 Years Old!

What You Don't See Can Hurt You

"We Almost Bought Another Make Machine . . ."

New four-wheel 630 . . . 420 HP (max. output) . . . 41.5 MPH . . . 28 cu. yd. heaped (21 cu. yd. struck)

Two operators try the

Does the new power shift transmission lessen fatigue and increase production? How's the

A. V. "Buck" McCurley

Operator 18 years
Tells about the 631

"You asked me to give the 631 the works. I did.

"And let me say right off I found power shift great. I didn't have to work so hard to keep the tractor rolling at top speeds up grades, through soft spots and on the straightaway. And with those three automatically selected drives for each of the three speed ranges, it has better speed selection than any other rig I've seen.

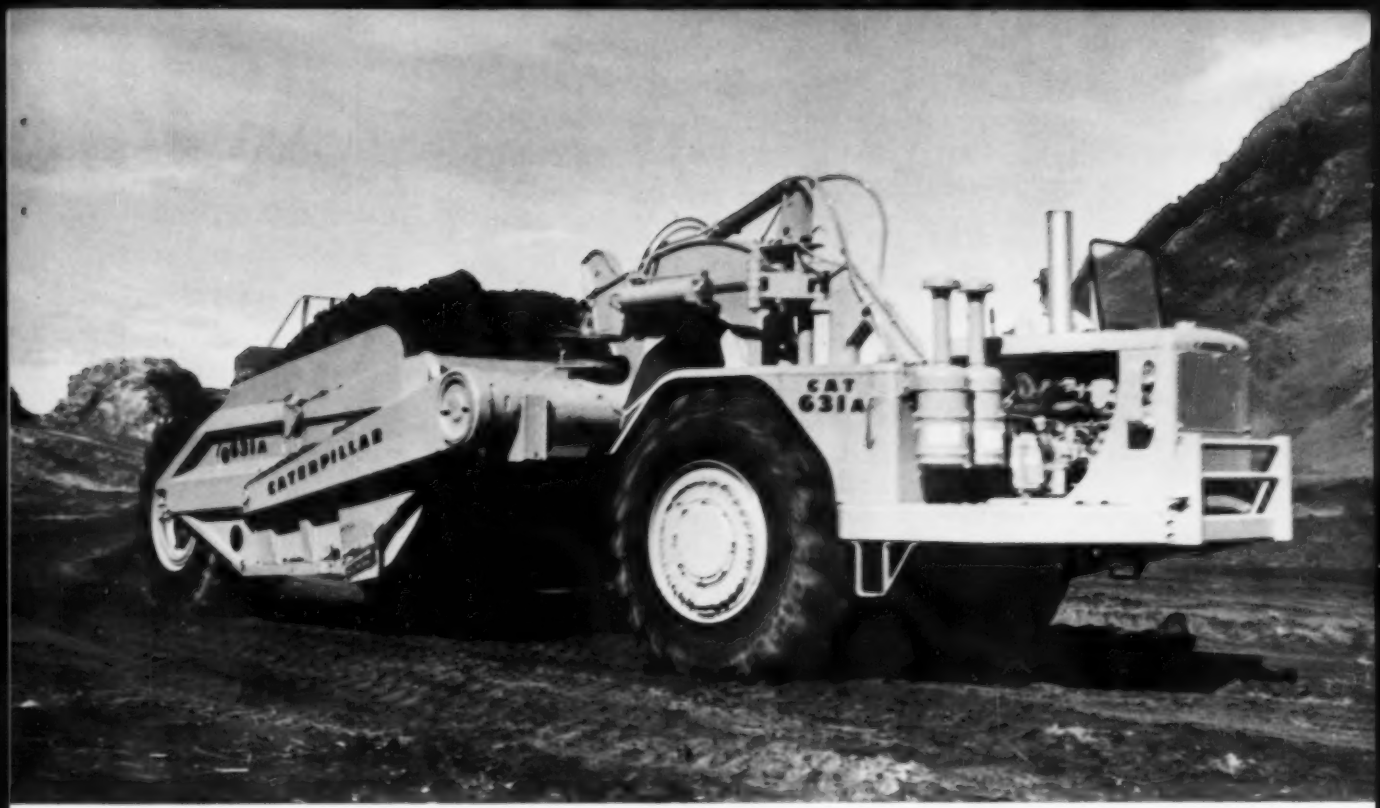
"When I start out in the cut in load range, the scraper stays right with the pusher—I don't pull away every time I raise the bowl to pump in a few more yards. When the scraper's packed full, I just slip the shift lever into 1st range, and feel the push of all those horses. Moving like this, it seems to take off in direct drive. On a dead start, it automatically shifts to direct drive in about 15 feet. It shifts easy, but I know when it happens. I feel the push in the seat when it accelerates. No jar—no thump—just an easy push.

"It's easy to tell when to move the shift lever. Just check the dial. It shows when to shift, up or down. And with the way the shiftbox is cut, it's easy to shift—just move the lever into the next corner and it's right where it belongs.

"I notice I travel faster than with a straight shift machine. When you run that kind of rig hour after hour, you don't shift every time you hit a grade or soft spot—that wears you out. But this power shift 631 takes care of that for you. For instance, say I'm running down the road and hit a soft spot. Or when I pull on the fill. The rig is going to slow down. This transmission automatically shifts down at the right time—and I'm under way at the best speed I can make.

"How does the 631 work on a grade? Well, with an oversize load I stopped it part way up a 7% slope, about 200 feet from the top. The roadbed was solid, with a little loose gravel on it. I put it in 1st range, and stepped down on the accelerator. No spin or bucking! The tires just took hold and up we went. It picked up the load right away, and in less than 20 feet it *automatically* shifted up to direct drive. By the time I reached the top it had automatically shifted to overdrive and was ready for me to shift into 2nd range as I topped the rise. That's the kind of power I like to feel in a tractor!

"I also tried this rig on a rough road at high speed, just to see what would happen to this automatic shifting when the machine started to bounce. On other power shift machines, I've felt that wild surging as the weight comes off the drivers and the transmission speeds up, then slows down as the weight comes back on. But not with this one. I went right over the bumps. With that solid drive it stayed right in gear without that



New two-wheel 631...420 HP (max. output)...31.2 MPH...28 cu. yd. heaped (21 cu. yd. struck)

new 630 and 631

new air-actuated cable control? Here's firsthand word from A. V. McCurley and L. H. Rife

surge. I kept safe control and *high speed.*

"To sum it up, I don't have to work as hard with this new machine, but I get more production at the end of the day. The 631 works in the highest gear possible for job conditions, to move the loads fast."

Leon H. Rife

Operator 20 years
Tells about the 630

"Power shift isn't the only big thing on these new machines. Take the new air-actuated cable control, for instance. (It's on the 631, too.) It's another muscle saver. Just a short pull—about three inches. I understand I'm just working an air valve, so there won't be any wear to loosen linkage. And it's so easy to pull. I'd say it's about 50% easier than the old one. That means a lot when you're picking up a load and dumping it every few minutes. This makes it sound like maybe I don't have real control of the cable. But there's some feel built into this unit so you can feel the strain on the cable.

"I noticed another thing. I don't seem to ride the clutch any more. I guess I used to because it took so much to pull the lever, and it traveled so far after it got worn, that I never really let go of the control lever when loading or dumping. But now this new Cat unit is either in or out. This should make it last a lot longer—cut down repairs.

"That new scraper is a humdinger, too. I don't know what's doing it. Maybe part of it is the new larger tires that raise the rear of the bowl a little more. But it loads better and faster. The dirt seems to boil up all the way across the bowl. And the front end fills up before the dirt starts spilling out. I've been getting full loads in clay—I mean every corner to the top—in a little over 20 seconds with just a single D9 pusher.

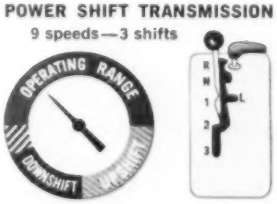
"There is one change in the scraper I really like. They raised those bowl lift sheaves about six inches. Now when I have to pump load, the material doesn't build up and get into the sheaves. It really cuts down on cable breakage.

"Mechanics tell me it should be easy to service these machines, too, because of the unit construction which allows them to work on all major components without disturbing others.

"There are a lot more features, too—you just have to work one of these rigs for a while to appreciate them."

POWER SHIFT TRANSMISSION

9 speeds—3 shifts



One lever gives operator instant selection of three speed ranges . . . dial indicator tells him when to shift. Within each range, transmission automatically shifts to torque divider drive, direct drive or overdrive to match conditions.

Flat Bottom Ditch Cut Twice As Fast by No. 14 Motor Grader

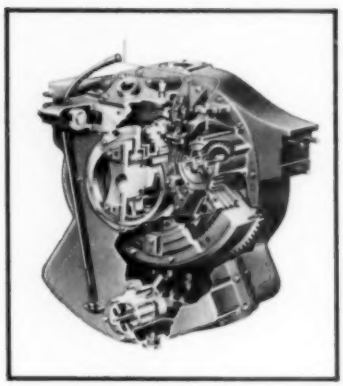
JOB DESCRIPTION:	No. 14 and No. 12 Motor Graders were each cutting flat bottom ditches along two miles of a highway resurfacing job.
LOCATION:	Highway 116, between Metamora and Roanoke, Ill.
OWNER:	R. A. Cullinan & Son, Tremont, Ill.
PURPOSE OF STUDY:	Compare production of No. 14 and No. 12.
RESULT:	Both machines worked along their respective two-mile stretches of highway for the same length of time. The No. 14 completed its job except for one final pass. But the No. 12 was less than half finished. It is conservative to say the No. 14 did the same work twice as fast as the No. 12!

Comments owner R. A. Cullinan, "The production difference on this job was unusually good—but my new No. 14 always outworks the productive No. 12 by at least 50% with only a slight increase in cost."

Many features contribute to this production advantage in the big No. 14: turbocharged 150 HP Cat Diesel Engine; power-assisted brakes and steering; new mechanical controls for fast blade response, precise adjustment; curved side shift rack for widest range of blade positions without adjusting linkage; and the exclusive Caterpillar oil clutch. When you need more production than the dependable 115 HP No. 12 can give, let the powerful No. 14 take over.

THE INSIDE STORY

Why the Cat Oil Clutch Is Such a Money-Saver



If you've owned old-style equipment, you're familiar with the problems of dry-type clutches—frequent adjustments and replacement, and "fade" in hard work. Hard work creates heat, and heat is the biggest enemy of clutches. While other companies have tried to make their clutches live with it, Caterpillar engineers solved the problem by removing the heat.

Parts in the famous Cat oil clutch run constantly in oil pumped from the crankcase. Thus clutch temperatures can never rise above engine temperatures to cause fade and glazing. As the clutch discs move to the engaged position, facings are oil-protected to prevent wear. As they become engaged, pressure between the plates forces all oil from the friction surfaces to eliminate slippage.

Millions of hours of hard work have proved the facings of the oil clutch undergo very little wear. In 1000 hours' operation you can expect wear of only about .0025 inch —less than the thickness of a human hair. In fact, wear is so slight the clutch operates up to 2000 hours without *adjustment*—and almost never needs replacement.

The oil clutch is standard equipment on all Cat Motor Graders and direct drive D9, D8, D7 and D6 Tractors. It is optional on the D4.

Roy Rash (right) discusses job progress with foreman B. F. Roberts

How a $2,000,000 business started with 4 used rigs

From a road job that paid $1.50 a day in 1930 to head of his own $2,000,000 construction company today—that's a capsule version of Roy C. Rash's rise to success. When he was asked how he accomplished it, this husky six-footer said: "It just happened. There's no secret formula. I'm just lucky to have good men and good machines."

A closer look at his background shows that a lot more than luck helped him get ahead. There's a solid backlog of good "old-fashioned" American virtues—hard work, long hours, thrift, drive and initiative, plus rung-by-rung experience in dirt moving that started at the bottom 30 years ago with the Hood County (Texas) Road District. He was 16 then, and his first operating job was on a Caterpillar Thirty Tractor that pulled a grader.

Other early operating experiences include stints on an RD8 and a No. 12 Motor Grader for the Chadwick & Williams Contracting Company. Later, he became a foreman and soon was a superintendent.

In 1943, Roy went into business for himself, starting the Border Construction Company. Up to then, his preference for Caterpillar was largely sentimental. But when it came time to buy his own machine, he knew sentiment couldn't influence his decision. He had to have machines that would make money or he would go broke. And since the capital he'd been able to save was limited, he had to get the best deal he possibly could.

Guided by this reasoning and his experience with earthmoving machines, he still chose Caterpillar, making a down payment for three used D4s and a used D7.

With these used machines, Roy first concentrated on building farm ponds and oil field roads. Then he branched out to larger jobs. Currently he is working on State Highway 359. As in his early days, he relies on Caterpillar to help him make money. His Caterpillar spread consists of two DW20s, two DW15s, five No. 12 Motor Graders, three D8s, two D7s and one D6.

He still works as hard as ever, too. His 12-hour days see him discussing job progress with his superintendents and machine health with his mechanics. He also finds time to keep on top of new developments in the construction business. He can quote weight, horsepower and capacity of most major manufacturers' earthmoving machinery. He is familiar with their strong points and shortcomings. And like all contractors he is eager to talk about what should be built next.

In starting with used Caterpillar equipment, Roy did just what many other ambitious one-time operators have done and are doing now as a result of their experience and the reputation of the Caterpillar Dealer for honestly described, rock-bottom-priced machines. In fact, to take the guess and gamble out of buying used equipment, the Caterpillar Dealer offers three types of *protected* buys—"Bonded Buy," "Certified Buy" and "Buy and Try." Financing can be tailored to fit an individual's needs.

Caterpillar's wheel loader line

brand new... and seven years old!

When did Caterpillar build its first wheel loader? If you say "last year," you're just seven years off—because the first model of the 944 was actually constructed 'way back in 1953. It looked somewhat different from today's production machines, but the basic design had been created and the first Cat wheel loader was moving material.

"Compared with machines on the market at that time," says one of the engineers, "that first machine probably was every bit their equal, but we felt it did not meet all the requirements we had established for this type of vehicle."

The following three years was a period of component refinement. Then, early in 1956, the new lightweight, turbocharged diesel engine was installed in the pilot model; a few months later the perfected version of the new Cat power shift transmission was added; and later the new "live action" hydraulic system was put in.

Now the 944 was judged ready for the most extensive testing program in the industry.

For some three years, the wheel loader was put through every possible torture test at Caterpillar's extensive Peoria proving grounds. Meanwhile, in the laboratory, component parts were worked thousands of times per hour to test fatigue resistance. And at the company's southwestern proving grounds, endurance was tested in all kinds of material, from dust to rock.

In March, 1959, the first Caterpillar wheel loaders went out on private jobs—with Cat engineers on hand to keep a critical eye on operating characteristics and judge customer reaction to the units. Several minor changes in hydraulic controls and visibility resulted from this final testing period.

Result? Three wheel loaders with advanced new design and seven years of experience behind them—the 1¼ yd. 922 (80 HP), the 2 yd. 944 (105 HP) and the 2¾ yd. 966 (140 HP). Already hundreds of owners are finding these safe, dependable Traxcavators to be top producers on all their materials handling and excavating jobs.

HIGH PRODUCTION FEATURES ON ALL CAT WHEEL LOADERS—POWER SHIFT TRANSMISSION for smooth, instant shifting... OPERATOR SAFETY with lift arms and cylinders all forward of the instrument panel... BUCKET CONTROLS on the right side leaving left hand free for machine operation... AUTOMATIC BUCKET POSITIONER... DUAL BRAKES, the left neutralizes transmission to transfer extra power to bucket... LIVE ACTION HYDRAULIC SYSTEM for tough material excavation, fast lift and dump... EASY SERVICE ACCESS, seat tips forward for easy access to transmission oil filter and control linkage adjustments.

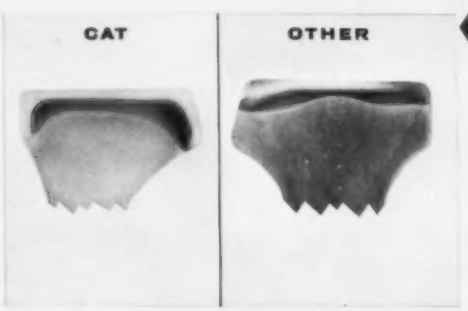
Special Report to Users of Caterpillar Equipment:

CAT CATERPILLAR

WHAT YOU DON'T SEE CAN HURT YOU

You can buy a lot of parts that *look* like genuine Caterpillar parts. Some may be cheaper initially. But they are as different as night and day when you get them in service.

Take these links, for example. They all *looked* identical when new. But see what has happened after 2000 hours on the same D8 Tractor! The two links in the center, a popular brand with induction-hardened rails, cost about 9% less than Caterpillar links originally, but showed about *50%* more wear.



The extra service you can expect from the Cat links can be seen and compared with other brands. Here are actual photos of etched cross sections of *production* links made by Caterpillar and the other manufacturer. The light areas at top show case depth and pattern of wear-resistant rail material resulting from heat treatment. See the deep, uniform wear case on top *and sides* of the Cat part? It's as hard as a good ball-peen hammer head. But in the other brand, the wear case varies both in depth and hardness . . . that's the reason why after 2000 hours the Cat-made links had worn 50% less.

Investigate and you will find superiorities for every undercarriage component built by Caterpillar. This extra quality—though it sometimes costs a little more initially—pays off by delivering many *extra* trouble-free working hours. That's why genuine Caterpillar parts cost you less per hour than other brands.

And when it's time to replace or rebuild your tractor undercarriage, see your Caterpillar Dealer. He is an undercarriage specialist with modern facilities to back him up. Get the full story on his many money-saving options and recommendations *tailored to your job conditions.* Truly CUSTOM TRACK SERVICE, designed to save you money . . . and offered only by your Caterpillar Dealer.

George and Donald De Bord, co-owners,
De Bord Bros., San Antonio, Texas

"We almost bought another make machine –then we watched a new Traxcavator with power shift transmission at work..."

When the De Bord brothers decided they needed a new front-end loader for their gravel pit operation, they looked the field over—and came close to buying another make of machine on a price basis. Then they watched it at work alongside a new Cat-built Traxcavator.

"The other machine seemed to be down most of the time," says George De Bord, "while the Traxcavator kept right on producing—and about twice as fast. That sold us, and we couldn't have made a wiser choice.

"Our new 955 loads out bank run gravel into 5-yd. trucks. Loading time per truck is about 75 seconds, with each load taking two full buckets and part of a third. The new power shift transmission makes it faster and easier on the operator. If we had them, we could load out 40 trucks an hour."

Many design improvements have gone into the new Series H machines to make them the big producers they are. Power shift transmission, for example, means that one lever gives split-second changes in speed and direction. New "live action" hydraulics provide faster lifting speed and greater lifting capacity. And the new 100 HP 955H has a big 1¾ cu. yd. bucket. Travel speeds forward range from 2.1 MPH in low first to 4.9 MPH in high second. Reverse speeds are 25% faster. Make sure you see it or the larger 2½ yd. 977H in action before you make *your* choice.

George De Bord operating the 955

For the best in new and used machines, and the best in parts and service—see your Caterpillar Dealer

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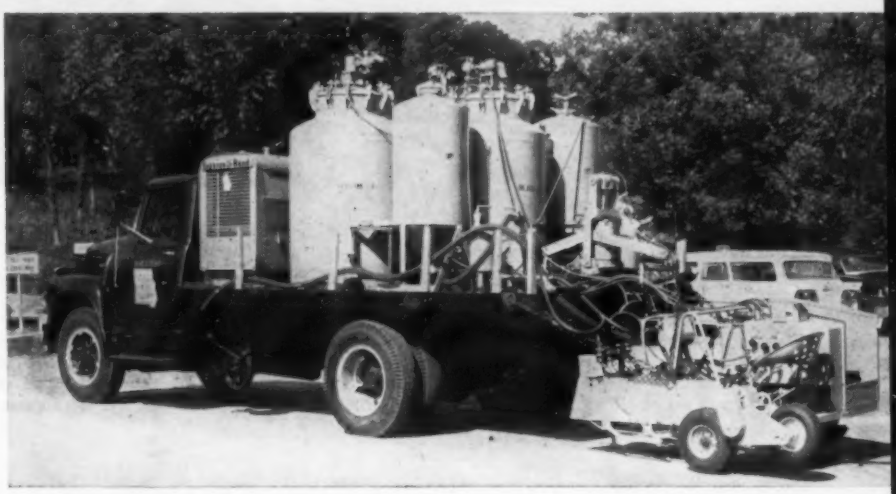
The Old
Missouri's famous pioneer highway striping rig, being retired after 25 years of service. (Authenticated News Photo).



The New
One of three new highway striping machines purchased by the Missouri state highway department. On board are two 200-gal. tanks and one 150-gal. tank for paint and a 1,000 lb. bead tank, modern compressor, pump and latest in hose connections.

Pioneer Line Striper Retired

The granddaddy of highway stripers in Missouri is being retired after a quarter century of service. This homemade machine, famous among highway departments as a pioneer, was built by equipment personnel of the Missouri state highway department in 1935. In those days highway striping was not considered the necessity it is today, but more as a luxury and a novelty,

For many years this 34-ft wonder did all highway striping in Missouri, chugging up and down the hills and around the Ozark curves, threading its way through metropolitan area traffic and "speeding" along open roads.

New striping machines were built or bought by the state in the late 1940's and early 1950's until each of the ten highway districts had its own. The original old-timer was assigned to District 6 at Kirkwood in 1956. The recent retirement of this "elder statesman" and other shop-built machines resulted from the purchase and assignment of three new factory-built (Wald) machines, assigned to districts at Kirkwood, St. Joseph and Hannibal.

The new machines will spray paint at higher pressure, therefore producing a better line. Each will carry 450 gal. of paint and 2,000 lb. of reflectorized spheres. In comparison with the old timer, which carried 400 lb. of reflector beads, it could handle 600 gal. of paint. Both the new and the old required only three men to operate it.

During the 25 years the old machine was in operation it ran up quite a record. It traveled 237,156 miles and spread an estimated 1,500,000 gal. of paint. In 1948 alone, when it was the only striping machine used by the state, it chalked up a record of 2,500 miles of asphalt road with white paint; 1,800 miles of highway with yellow "No Passing Zone" paint; and 1,000 miles of black center lines on concrete pavement. A record run of 125 miles in one day amazed other departments. The ability to stripe at high speeds was one of the features built into the old machine.

The machine won't be junked just because newer and younger machines are coming into use. The old timer will be kept in the headquarters garage in Jefferson City and stand ready for emergencies.

The contractor, John Dieseth Co., used this stationary set-up for a Pettibone-Wood mobile mixer to process soil-cement. The machine was elevated on 7-foot-high legs. Cement fed from a Johnson silo into top of the mixer by an Eagle fines feeder, via cut-out opening in top of mixer. The loader feeding the truck is an old Adams mucker converted into a conveyor and powered by an International motor. The dump truck on the Thurman scale is an International Harvester 185.

Initial compaction of the soil-cement mix was accomplished with a Seaman-Gunnison Duo-Packer. Compaction for this project was done entirely with pneumatic tires.

Centrally Mixed Soil-Cement Builds Up County Road

By Maynard E. Wing
Highway Engineer, Norman County, Ada, Minnesota

Maynard E. Wing

An important farm-market road in our county has been rebuilt for a heavier axle-load rating using soil-cement, centrally processed and employing borrow soil. This road is County State Aid Highway 3 in the fertile black-soil Red River Valley of the North. The valley's heavy plastic soil, famous for crop yields, is difficult to stabilize. The road problem is complicated by the scarcity of good aggregates in quantity. Our solution for CSAH3 therefore is considered to be of considerably economic significance.

In designing the improvement for a 15-mile segment of this road, a comparison of costs was made between granular base and soil-cement. To provide a 5-ton-per-axle load roadway, it was learned that the heavy gumbo (fertile black soil) would require 9 in. of subbase and 3 in. of crushed gravel base under a 1½-in. bituminous surfacing.

We wanted to preserve the geometric standards of the existing road which were satisfactory. The grade line was good, slopes were 3 to 1, and adequate drainage. But the existing roadbed was too narrow to accommodate the granular thickness and paving required (9 plus 3 plus 1½ in.). To do so would mean widening of the roadbed which, in turn, would require acquisition of more right-of-way, lengthening of culverts and costly relocation of power and telephone poles and lines.

Investigation of soil-cement disclosed that we could attain a 7-ton axle load design with 6 in. of depth. Thus the drawbacks of the granular base were eliminated, and the required amount of gravel was cut in half. Conservation of gravel is of prime importance in this area. (Incidentally, the quality of gravel on this soil-cement construction was considerably below that required for stabilized granular base.)

All of the factors of design and materials, resolved in terms of dollars and cents, showed a saving of more than $5,000 per mile in first-cost by using soil-cement. In addition, we built a road capable of carrying 7 tons per axle instead of 5 tons.

With soil-cement at the choice, we set about sampling the borrow pit and determining the needed cement content. This led up to the question of central-plant mixing vs. road mix. Tests made showed that 7 percent of cement by volume would produce a sound base. This cement content gave a mixture of approximately 5.5 percent by weight.

Since the aggregate was to be hauled onto the roadway, we decided to specify central-plant mixing of the soil-cement, and special provisions to cover this procedure were written. The following aggregate gradations were established: 100 percent passing 2-in. sieve, 45-100 percent passing No. 4; 30-80 percent passing No. 10, 10-65 percent passing No. 40, and 5-20 percent passing No. 200.

Stockpiling of the borrow material was decided upon as a means of better control and uniformity of the aggregate. Stockpiling also pleased the contractor, John Dieseth Co., Fergus Falls, Minn., because of the haul length.

The contractor set up the plant in the middle of

Continued on page 67

"Rock is nothing new for this TD-25"

Contractor Preston Cottrell, Kalispell, Montana, owns this International TD-25 that's roughing out a mountain logging truck haul road on swampy, rocky, machine-mauling terrain. The TD-25's operator, William Clark, comments: "This '25' worked in rock all summer—works well in rock; has got lots of 'soup'. And it's got the special advantage of having the power on both tracks all the time." Owner Cottrell adds: "Best of all tractors I've ever used for road-building."

How Owners rate Planet-powered "25's" COMPARED TO THE CRAWLERS THEY REPLACED!

"TD-25 outworks any rig of its size we've used"

"Our TD-25 does more work in a day than any competitive tractor its size we've ever used," reports Gen. Supt. G. H. Crouch, for W. Owen Flowe & Son's contracting firm, Charlotte, No. Carolina. "Live track steering and over-all balance enabled the TD-25 operator to grade within .02% of the 24-degree, 1,000-foot long track slopes—within four hours. A motor grader would have taken two days to do this same job. TD-25 live track Planet Power-steering gives accurate load control with no side slip." Here, TD-25 is digging out a 20-ton boulder—a step in building the huge new Charlotte motor speedway racing track.

"TD-25 Planetary steering benches rock in 2nd gear"

"Planet Power-steering makes the TD-25 especially good for benching and bank-cutting—and it really takes the passes of rock in second gear (where 1st gear is usual with clutch-steered rigs)," states Kinney Hamm, for Albert Brothers Contractors, Roanoke, Va. "I can operate the '25' with my little finger, and with confidence." This Albert Brothers' TD-25 is blading huge loads of shot rock aside on a hilltop cut of an Interstate Project near Buchanan, Va.

"Better pusher control on all terrain"

"TD-25 planetary steering gives the operator better pusher control of the scraper load in all types of terrain conditions," states Grady B. Stancil, Stancil Bros. Construction Co., Snellville, Ga. "TD-25 has no match for work on grades as it will back up slopes and maneuver." View shows Stancil TD-25 pushing an International Payscraper on state highway job near Lawrenceville, Ga.

"Our TD-25's save time and dynamite in rock"

"The road-building capacity of our TD-25's is something you must see to believe," declares Contractor Russell Train, Myrtle Point, Oregon. "They cut the roads out faster—save time and the cost of dynamite ripping through rock strata we always had to blast before." Here's one of owner Train's TD-25's benching out type EE Forest Service roads that will be rock-coated for all-weather use.

See how "live track" TD-25 Planet Power-steering gives you full-power momentum—and eliminates load-limiting "dead-track drag." Try on-the-go, Hi-Lo power-shifting that ends "gear-shift lag." Compare how this power-steering, power-shifting combination teams with 230 work-slugging turbocharged Diesel hp—to outwork king-sized clutch-steered crawlers job after job! Let your International Construction Equipment Distributor demonstrate the TD-25!

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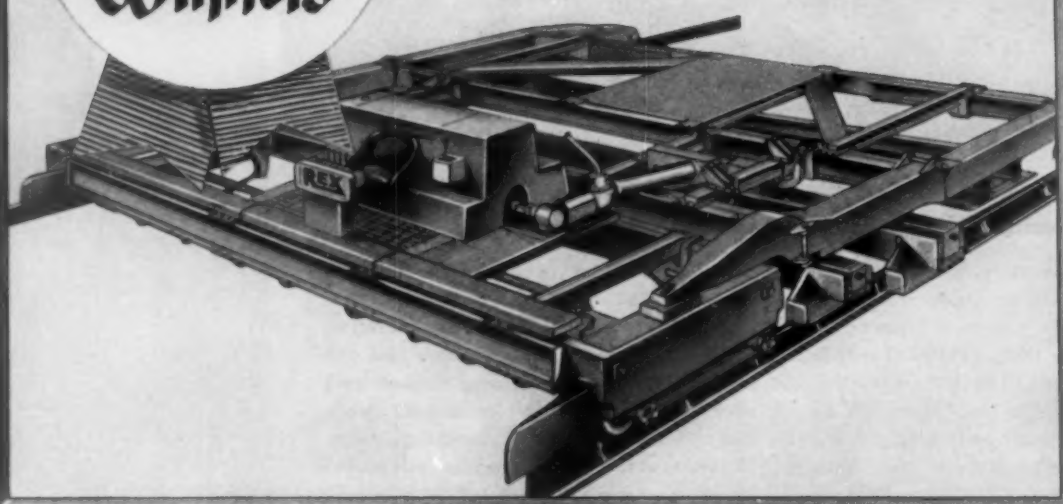

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A Jersey spreader was used to place the soil-cement. Contractor's truck seen here is a Ford T-700 with a Dunn dump body.

CENTRALLY MIXED SOIL-CEMENT

Continued from page 63

the project for the first half of the job, and near the terminal of the project for the completion. The arrangement worked out well for all concerned, as shown by the control factor of the aggregate and the uninterrupted progress of the job. Field tests showed only minor variations in gradations. The contractor was able to mix and place approximately a mile of roadway per day. It was a project that progressed smoothly.

To meet existing grades such as railroad crossings, bridge approaches and truck highway intersections, some roadway excavation was necessary. In these areas where the gravel surface of the roadbed was disturbed, and in one area where a soft section developed, the soil-cement base was thickened to 8 in. for more support. The remainder of the road was held to 6-in. compacted thickness.

For the mixing plant, the contractor used a Pettibone-Wood traveling plant, modified to suit stationary plant-mixing. The aggregate conveyor, cement feed, and water feed were electrically wired so as to

Surface compaction planes were removed with a nail-tooth drag pulled by a Type 640 Ford tractor. A Caterpillar 12 motor grader seen compacting the sloped edges.

Replenishing moisture lost by evaporation via 750-gal. tank with Rex 15-M pump on the spraybar. Final shaping of soil-cement with blade also pictured.

stop all operations instantaneously should one phase malfunction. All phases were calibrated to insure a mixture of 5.5 percent cement by weight, an optimum moisture content of 9 percent. The initial calibration set the plant operation at a 200-ton per hour capacity. The mixing operation was carried on at this rate for three days, and the plant then re-calibrated for 400 tons per hour. Those first three days gave us a chance to make sure the "bugs" were out of the plant setup. Once assured of this, we were able to maintain the 400 tons per hour for the remainder of the project.

The cement silo was rigged with a buzzer set to ring when the silo was full. Each cement tanker was weighed in as it unloaded into the silo, and a cut-off was made each time the buzzer sounded. This gave us an accurate check on cement content about every 50 loads or 600 tons of mixture. By deducting the moisture content, we obtained the cement dry-mixture ratio, and could therefore reasonably control the 5.5 percent cement weight content.

The soil-cement mixture was hauled from the plant to two Jersey spreaders on the road. The loose material was spread approximately 7½ in. thick, giving us a compacted depth of 6 in.

Field density tests taken every 500 ft. on this project showed an average density of about 108 percent of laboratory maximum. Our test cylinders, which were sent to the Minnesota department of highways laboratory, showed an average 7-day compressive strength of 750 psi, with some specimens going as high as 1,500 psi, plus. Only five of these cylinders broke at less than 500 psi. The results of these tests verify our feeling that this is an extremely strong base.

This soil-cement base was covered with a 1½-in. plant-mixed bituminous wearing course, using SC-5 liquid asphalt. Our feeling was that this asphalt grade would have a good kneading quality and would thereby seal the shrinkage cracks by itself.

The average cost per mile of this project was $18,795, in an area where previous improvement estimates have approximated $25,000 per mile. The base itself cost $13,915 per mile, the surface $4,880.

Another essential step in the soil-cement processing: leveling the surface with a broom drag. A 13-tire Bros gave the final rolling.

Mr. Cletus Dyar, Delano, California

HI-WAY SURFACE TREATMENT REPORT

Towed Paver Doubles Production on Half a Crew!

HI-WAY Model "AS" proves big capital investment not needed to build thriving blacktop business

"Without investing a great deal of money, I doubled my production and eliminated four out of the seven men I formerly had to use to help spread the asphalt," reports Mr. Dyar. "When we first started in blacktop work, we improvised a home-made paver, and it took us eight hours, using seven men, to spread 35 tons by hand. Now, with my HI-WAY 'AS' paver, I can pave an average driveway in two hours, approximately 150' in only one seam. Certainly, the spreader has helped me to bid on jobs we might have considered over our heads previously, and for my money, it's the best little paver for small parking lots or driveways."

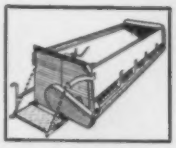
Mr. Dyar's job on the parking lot for the Earlimart Veterans Memorial Building in Earlimart, California, (pictured here) called for 130 tons of hot asphalt. In the preparation for the paving of this parking lot, he first made an 8" fill and then applied 2" of rock dust, utilizing his "AS" spreader for this application, also. The parking lot is 60' wide and 180' long. It will take seven seams of 2½" of hot asphalt. The screed is usually set at 2½" for parking lots—1½" for driveways.

However, the screed has been set as high as 6" quite frequently for spreading sand, dirt, and rock dust. In these applications, he usually sets the screed at 2". "Once when I was fixing a driveway," said Mr. Dyar, "I tilted the screed and used it as a scraper blade. It worked real fine. Last fall, when spreading oil dirt, we used the heated screed, and it was just wonderful."

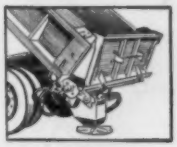
His last big job, other than driveways, was a parking lot for a drive-in-restaurant in Delano. This job called for 230 tons of asphalt. In another job calling for 470 tons for a parking lot for the Catholic Church in Delano, Dyar's *8-ton trucks deposited their load through the HI-WAY "AS" Spreader every (7) minutes.* The mix used generally includes ⅜" rock, asphalt oil, and sand.

"We have used our HI-WAY 'AS' Spreader to great advantage," continued Mr. Dyar. "We tie it right on to our truck and take it anywhere we want. A lot of new people are moving into this area and I expect quite a demand for parking lot and driveway paving."

Your Nearby HI-WAY/MAN Can Demonstrate Every Type of Surface Treatment Rig



TOWED TYPE



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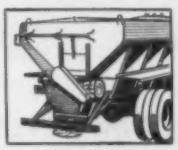
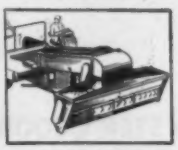


BODY MOUNTED



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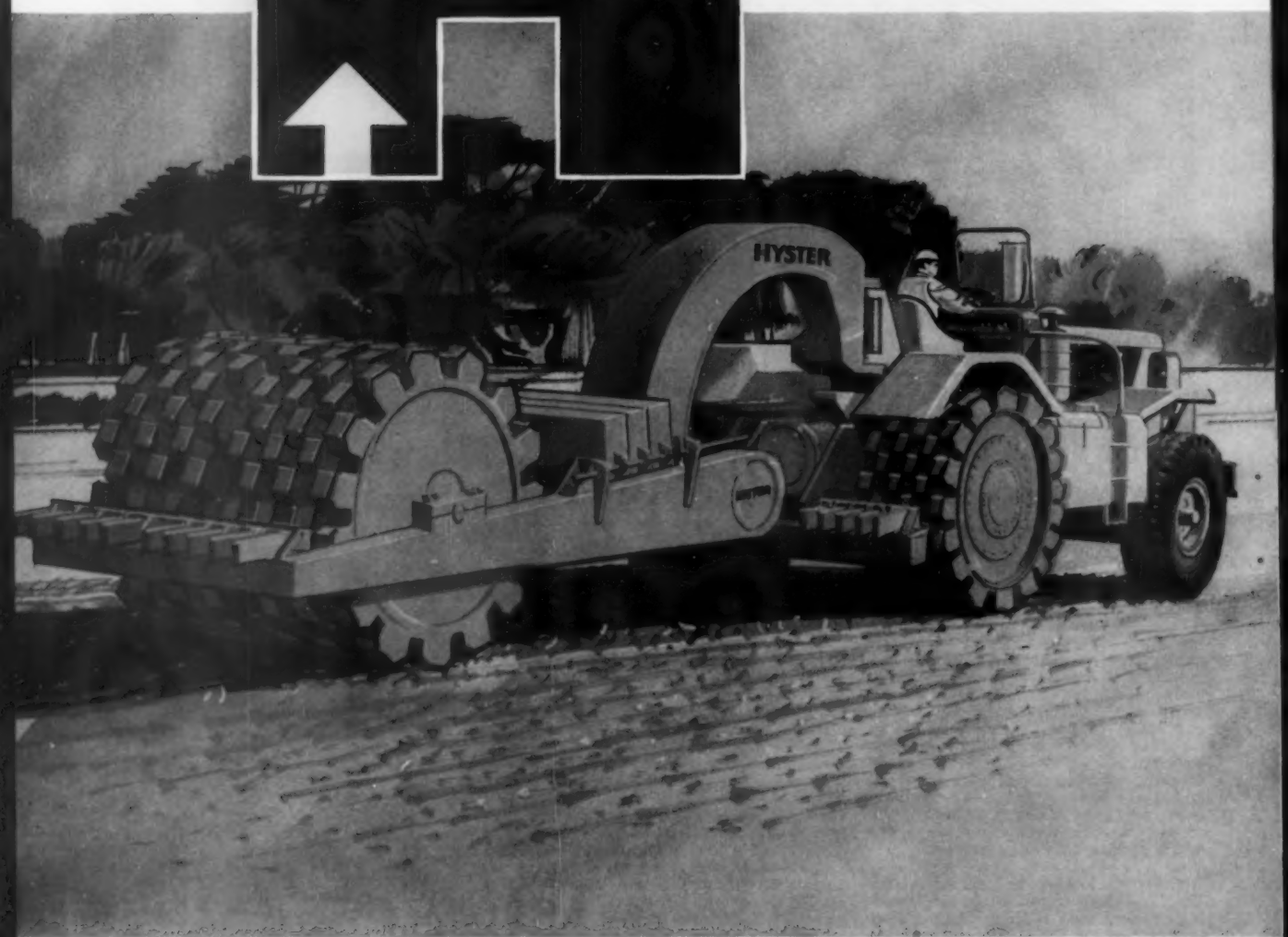

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What a combination! Increased in size and speed, new Hyster Model C400B gives you compaction costs lower than ever before. Matched with the power and speed of the Cat 630A Tractor, this machine keeps spreading and compaction in balance. Why limit job production to the snail-like pace of an outmoded roller. Get the advantages of rolling 10′ 10″ per pass at speeds up to 15 mph. Get as high as 2,000 cubic yards in-place per hour. Get a Hyster C400B Compacter!

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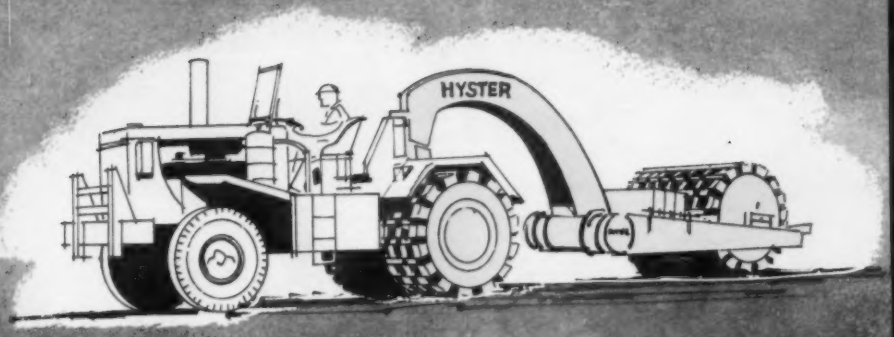
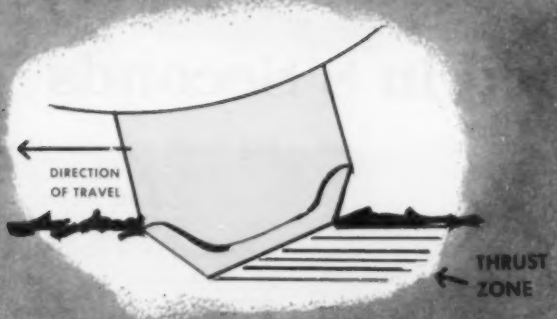
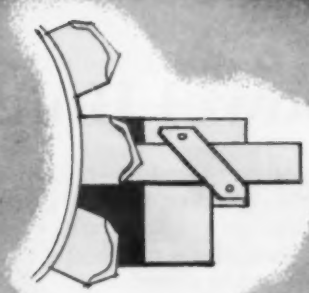




MAXIMUM TRACTION

Tamping feet sloped at an angle of 15° provide higher traction than flat pads—they thrust against partially compacted soil—do not rely on friction alone. A Hyster exclusive feature.



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DW20A COMPACTER

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Dowel holes would be awkward and troublesome to drill manually, due to the horizontal position. This machine made fast work of this task on a Dallas paving project.

Dowel Holes Drilled in 8 Seconds

Problem: to drill horizontal holes at close intervals along the inner edge of an existing curb, for setting dowels to conform to a new pavement design.

The old way: chisel them by hand, with considerable sweating and labor-hours.

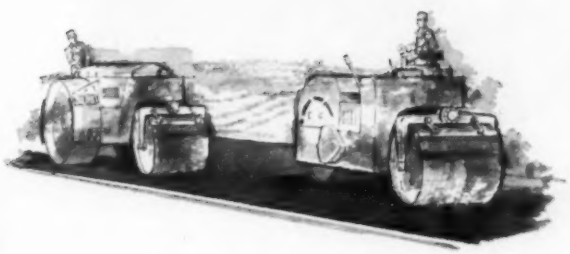
A high-speed method seen recently at Dallas: drill holes in about eight seconds each, using a special rig that holds a 1½-in. carbide insert bit and jackhammer steel against the curb concrete, and which also travels rapidly along from hole to hole.

This rig, here pictured, was devised by employes of Austin Paving Company, of Dallas, the contractor on one of Dallas' recent arterial street modernization projects. The problem was to drill holes at two-foot intervals for grouting in ½ in. dameter dowels to bond the old curb-and-gutter with the new concrete pavement. The rig itself consists simply of a small Hough loader with scoop removed and hydraulic front lifting frame fitted out with the drilling unit shown.

Hydraulically controlled lift and lateral positioning enabled the operator, via levers, to position the bit and apply pressure during the drilling, then quickly withdraw the bit and move to the next hole location. A self-propelled LeRoi Tractair, following close along, supplied the necessary compressed air.

Closeup of the special frame and shoe assembly, which holds the drill in a predetermined position below the curb edge while drilling takes place. An example of resourceful thinging by employes of Austin Paving Company.

Better rolling with less maintenance



For years a major problem confronting owners of rollers has been road "scuff" caused by looseness in the guide roll assembly. Huber-Warco engineers have solved this problem by making it easy to adjust all elements of the guide roll right on the job. Owners of Huber-Warco tandem and 3-wheel rollers will find a yoke design that permits accurate adjustment of tapered roller bearings at the kingpin, yoke swivel pin and roll axle. As a further precaution against looseness, we have set the bearings on the swivel pin and kingpin wider apart as well as designing a steering arm that is splined — not keyed — to the top of the kingpin, spreading the shearing load around the entire circumference of the pin. Extra long life of the assembly is further assured since all points of movement receive full pressure lubrication. With Huber-Warco design you are assured indefinite factory-perfect guide roll assembly adjustment. See your local Huber-Warco distributor for all the details on the tandem and 3-wheel rollers soon.

HUBER-WARCO COMPANY • MARION, OHIO, U.S.A.

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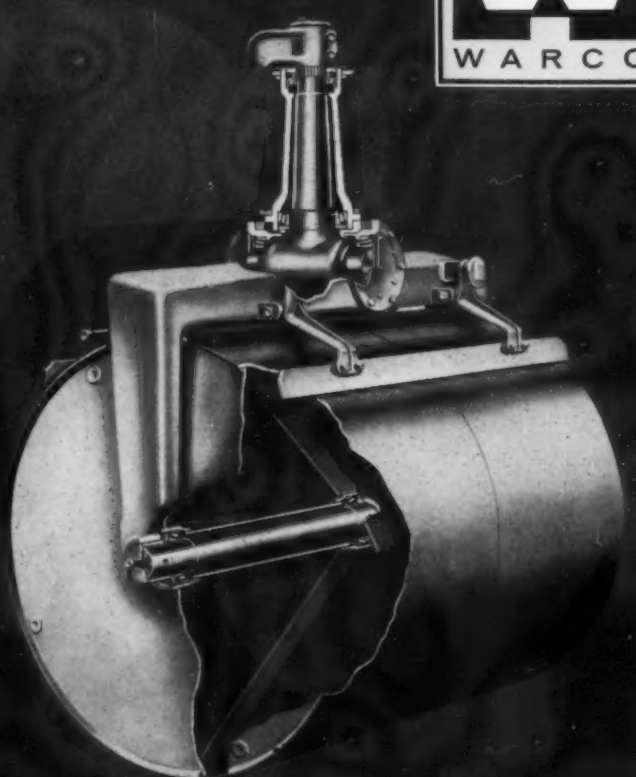


BUILT FOR PROFIT

1927 A good day's scraper production was 100 cubic yards in 9 hours with horse or mule team, costing $50 per day. This spread is seen repairing an irrigation canal levee in California.

1961 This modified scraper with 34 cubic yards struck capacity is taking on a 90,000-pound load in 0.8 minutes, aided by two heavy tractors specifically equipped for "all out" tandem pusher operation.

Earthmoving—
Mostly About Scrapers

By Kenneth F. Park,
Consultant

Kenneth F. Park

If there is any virtue in another article about earthmoving, it should lie in the ability to be informative, helpful, and to lend a fresh perspective.

Because earthmoving work is so diverse and its facets of interest so varied, the task should not be hard. At least the contents of this article series has the merit of a great deal of study, engineering, travel and truth. The author has been a part of the development of scrapers, crawler drawn or on rubber, ever since their present form was conceived. Millions of yards of earth moved by these machines have passed in front of his eyes. For years no earthmoving job of special interest on this continent was long without a visit by the writer.

Our first introduction of scrapers to old-country areas was about 1933 or 1934. We placed on an earthen dam, a tractor-scraper that moved about 50 cu. yd. an hour, where natives had been hand-placing about a yard a day each for the munificent sum of 7 cents per day.

Not long ago we moved over 2,200 cu. yd. an hour on a 750-ft. haul with three big modern scrapers and big pushers in tandem. In this manner times have changed. Better machines, better methods.

New Machines Born

Dating back to 1805 there were patents taken out on scrapers called, "an Earth Raising and Moving Device." "Drag scrapers" and "self-loading carts" showed up in 1830 patents. Many so-called scraper units made their appearance during the following years, but never gained any particular footing.

One of the most used tools in the early memory of the writer was the Fresno. This was patented July 25, 1882, by James Porteous, a blacksmith in Fresno, California. The Fresno's use was general for many years, even up to the 1930s when the first tractor-drawn scrapers became general. Our records of 1927 show these (Fresno) units were moving about 100 cu. yd. per 9-hour day on a 250-ft. haul. The cost, with driver, was then about $50 a day. At least, the Fresno was a kind of forerunner for the tractor-drawn scrapers.

Bob LeTourneau's first scraper—the first of its kind

Continued on page 78

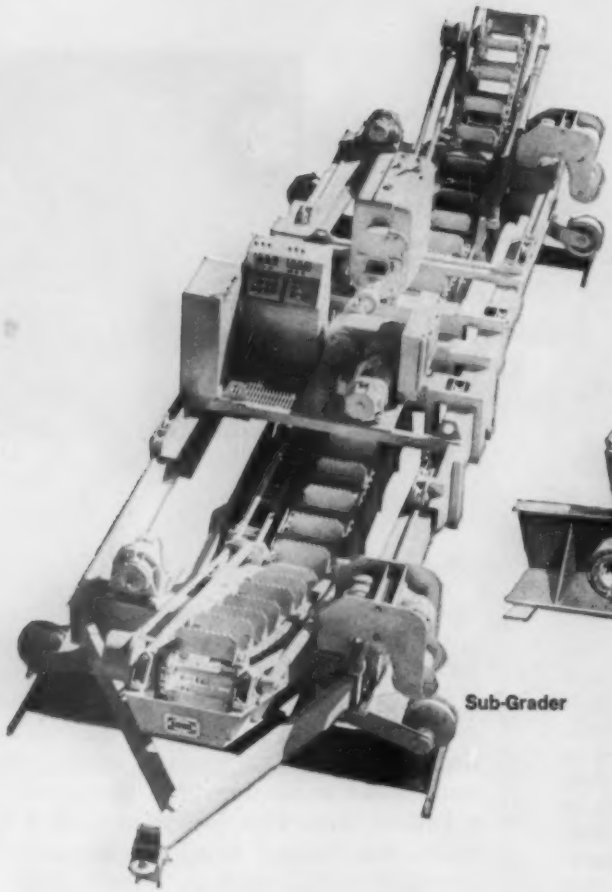
Editor's Note: This series is the beginning of a four-part review of the profit factors in selecting, owning and operating a scraper spread written by a veteran who is acknowledged one of the top-ranking analysts and consultants in earthmoving equipment utilization. Mr. Park, who is a Fellow, American Society of Civil Engineers, has helped bring an engineering approach to this rough-and-tumble field.

This month's introduction looks at how it all started—and emphasizes the importance of organizational competence. Succeeding parts get into push loading, ripping, requirements of scrapers themselves, effect of grades, tandem pushing, and other factors in getting top production.

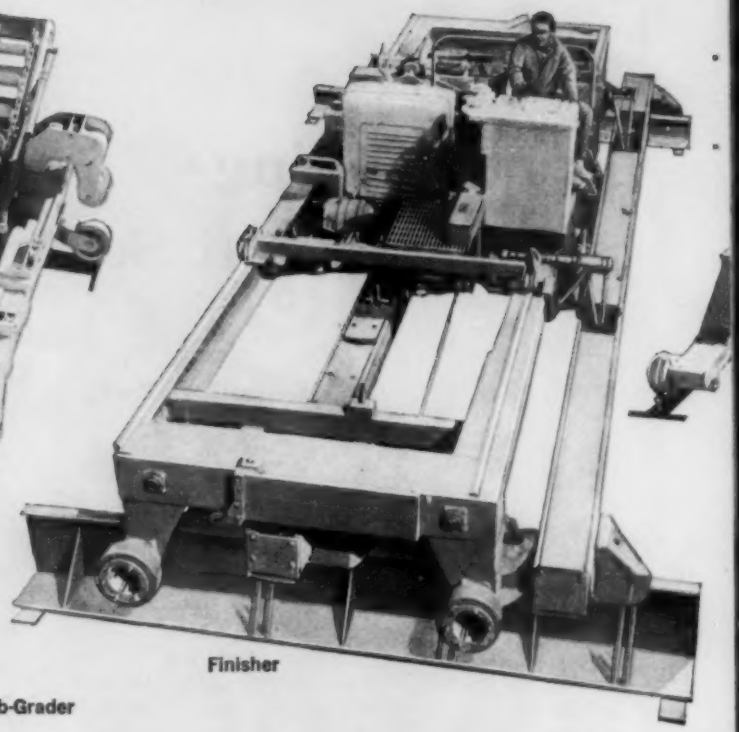
The series concludes with an analysis of cost factors necessary for realistic and accurate job planning and bidding under today's tight competitive conditions.

Discussion is invited from readers who have experience that bears on any of the ideas and factual data covered by Mr. Park. Address the Editor (see below), or write directly to Mr. Park at 191 Covington Street, Oakland 5, California.

For contractors or distributors interested in securing extra copies of the series for their staff people, multigraphed reprints of the text only will be made available. A single copy or a few copies, free on request. Address The Editor, Roads and Streets, 22 West Maple Street, Chicago 10, Illinois. Please use your company letterhead in writing.



Sub-Grader



Finisher

Sub-Grader—Revolutionary pushbutton power widening from 12′ to 28′. Automatic control system sets frame, conveyor and cutter bowl adjustment up to 4′. Easy-to-add sections readjust conveyor and cutter unit to 8′ to 12′. Entire range of depth adjustment made with synchronized electric power from 0″ to 12″. 14″ of height adjustment for form clearance at each end truck, independently or simultaneously. V-crown adjustment electrically controlled to within 3″. Parabolic crown hydraulically controlled. Electrically-powered travel speeds forward and reverse up to 40 f.p.m.

Finisher — Revolutionary pushbutton power widening from 12′ to 28′ without frame alteration in an infinite range of increments. Frame positions automatically without bolts or clamps. Screeds available in both crown bolt and quick adjustable types. Screed speeds infinitely variable between 40 and 105 strokes per minute, are controlled independently from traction speeds. Traction speeds infinitely variable between 8 and 80 f.p.m. through heavy-duty, high torque, variable frequency AC motors and gear reducers in each end truck. Power supplied by variable speed alternator driven by 4-cylinder engine.

Finisher Float — Pushbutton power widening from 12′ to 28′. Screed and pan-type float are quick adjustable for crown and operating position with synchronized electric power. Suspended oscillating screed is powered from Finisher through electric clutch and universal drive. Float is attached to Finisher and controlled through its own pushbutton controls mounted near the control panel of the Finisher.

Concrete Spreader—Automatic transverse blade delivers spreading action regardless of where concrete is placed on subgrade without segregation. Machine available in two standard widths—10′ to 15′ and 20′ to 25′. Vibratory paving attachment available to compact concrete simultaneously with spreading action. Rubber-tire transportation wheels available for spreader and vibratory attachment.

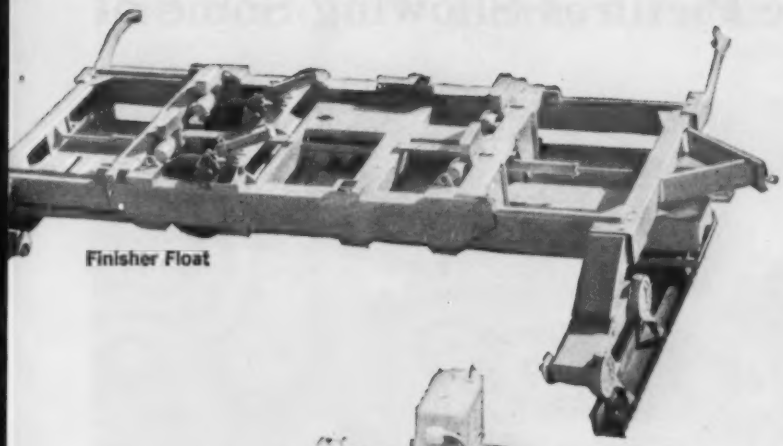
THE NEW LOOK IN CONCRETE PAVING:

MORE AUTOMATIC,

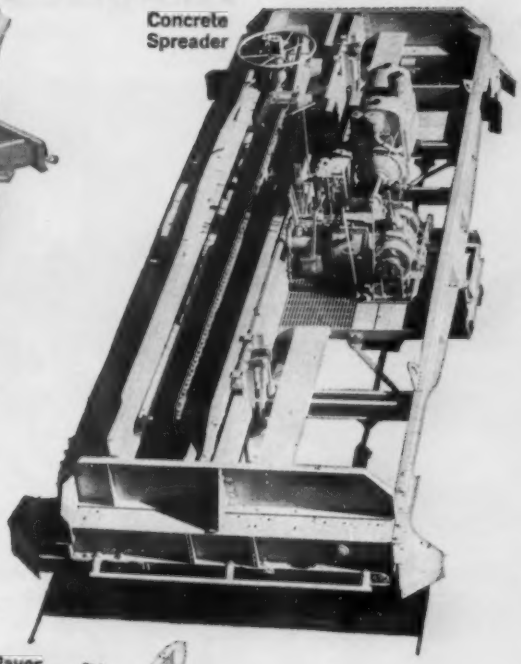
Here's concrete paving equipment that gives you flexibiltiy and automatic operation to a degree never before possible.

With these new Blaw-Knox machines in your paving train, the day is gone when a change in paving width meant hours of delay in resetting machines. These Blaw-Knox machines give you pushbutton, power widening right on the forms!

Check into the features of these new, automatic machines. They'll help you bid closer, work tighter and make more money the day you put them to work! Your Blaw-Knox distributor is the place to get started. Blaw-Knox Company, Construction Equipment Division, Mattoon, Illinois.

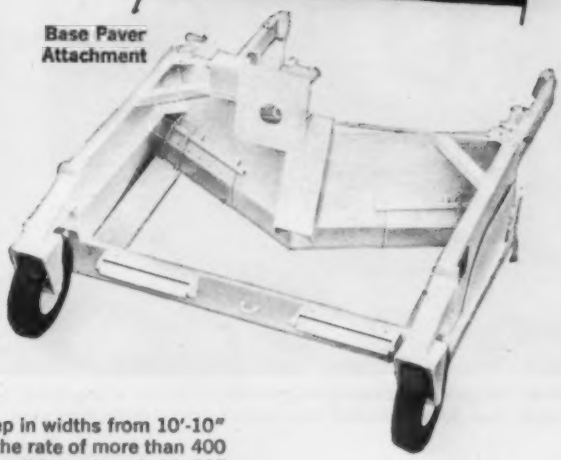


Finisher Float



Concrete Spreader

Self-Propelled Base Paver



Base Paver Attachment

Base Paver Attachment—Big capacity unit designed especially for use with standard tractors of sufficient power. New universal hitch makes attachment easy. Equipped with its own engine-driven oscillating screed, and mechanical crown adjustment. Spreads stone, slag, gravel, soil cement and plant mix aggregates 1" to 20" deep in widths from 10'-10" to 16'-0". Hopper lifts completely for travel.

Self-Propelled Base Paver—Big capacity unit spreads stone, slag, gravel, soil cement or plant mix aggregates 1" to 20" deep in widths from 10'-10" to 16'-0", at the rate of more than 400 t.p.h. Tractor unit is equipped with 21" wide crawler shoes for maximum traction and flotation on softest base. Equipped with high-speed oscillating screed, front wheel power steering, dual controls. Four forward and four reverse working speeds, one forward and reverse travel speed.

VERSATILE, RUGGED THAN EVER BEFORE!

BLAW-KNOX

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Historic Pictures Showing Some of

Steel-wheeled "Highboy" scrapers, 1930—emptied by a top-hung beam and back plate swinging through an arc. An early scraper design that foreshadowed the rubber-tired equipment soon to follow. California levee project.

EARTHMOVING

Continued from page 75

Stockton, California, in 1922. It had three collapsible bowls, and five electric motors. In 1923 came the "Mountain Mover." In 1928-1929 there appeared the first cable controlled scrapers, handled by the wonderful old Caterpillar gasoline "60" tractor. The first cable control—as were many more that followed—was made from an old Hudson automobile rear end.

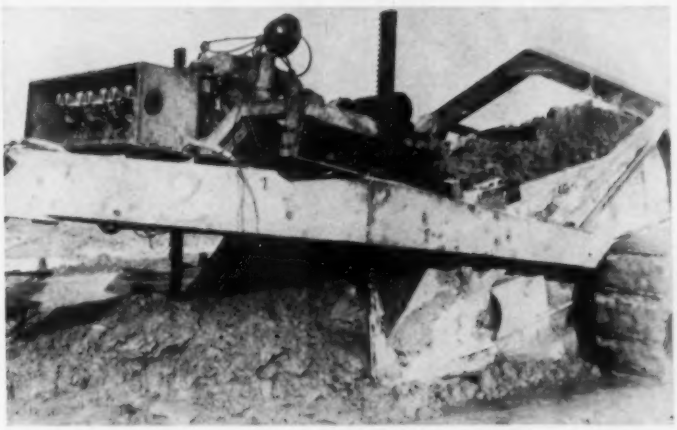
In 1930 the writer thought he recognized in scraper use a major new mode of construction. Extensive studies and analyses were made. Also at that time, the first (it is believed) estimating and performance concepts set up, such as are used so extensively today by those in the business. Out of a welter of information—including data collected in the past few years—has sprung the use of the term "Basic Principles." This expression will be used many times in this series.

Basic Principles Explained

These "rules" actually are merely commonsense measurements of performance, generally supplied by force, power, weight, speeds, etc. A horsepower consists of 33,000 ft.-lb. per minute—the equivalent of raising 33,000 lb. 1 ft. in one minute. By using the various elements of the formula, in known quantities, the rest can be figured. Rates of friction between different surfaces are well known and can be applied to the many conditions they fit. Machine performance can be figured by use of the proper values. Travel up or down a grade is subject to gravitational influence in set amount, and so can be computed. Rolling resistance with about the same tires and pressures is similar for most machines. And so on.

Loading a machine of such universal design as a

The Scraper's Early Beginnings



Dating from 1922, one of LeTourneau's earliest efforts—an electrically controlled scraper, pictured in operation near Stockton, California.

The first LeTourneau rubber-tired scraper—a "Z" model, capacity about 15 cubic yards struck. Kenneth Park was chief field engineer. Mr. LeTourneau seen pointing.

Another pioneer scraper fitted out all around with rubber tires. Seen working near Indio, California, in 1932. This model "A" unit pushed its load out from front to back.

A 1929 model steel-wheeled "Lowboy" on California levee work—one of the many early scraper variants.

scraper makes a pattern of speed and accomplishment, which can be very closely calculated if the power is known. So many things about machines are subject to the same actions that an engine, for instance, will have the same laws of demand and performance on most any machine, so will bear similar calculations. Volumes (carrying capacities) will react in similar machines in similar manners, so can be treated in about the same manner. So it goes, through the gamut of construction machines. The same kinds of rules generally apply to most tools.

There are a few ideas in the building of every earthen structure that must be considered. In the main, though, just two are basic. The Owner wants dirt moved from one place to another for some reason. The Doer wants a profit. There are all kinds of plans to give each his respective wish. The better the plans, the better the gains.

The Engineering follows much a set pattern. The plan should be good and of sufficient value to warrant its being carried out. In such form the task becomes that of planning and management in relation generally to the economic good of the People.

The Contractor's position in this scheme is one in which he should know many of the ramifications. His need basically is to understand some of the economics, some of the politics, a whole lot of the engineering needs. He should own the right kind of equipment, employ and direct the best kind of people to assure the equipment's being used to best advantage. He cannot expect to keep the complexities of the company he owns all at their best. Enough that he directs, consults, manages.

Continued on page 78

ONLY LOADER WITH..

You shift from any one gear to any other—forward or reverse...on-the-go. Allis-Chalmers tractor loaders make fast work far easier for any operator.

It's simple for a tractor loader operator to work faster—get more done. It's just as easy for him to go into a high gear as into a low gear—forward or reverse. ONE LEVER controls both speed and direction. No fumbling around with two or more levers or a combination of levers and foot pedals.

Besides operating simplicity, a tractor loader has *firmly connected axles*—attached to frame with 2-inch diameter steel pins . . . no rolling and shifting under load. *Extra stability* lets operators get and deliver

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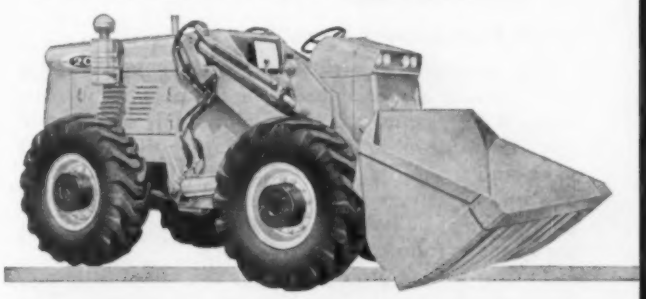
bigger loads with greater comfort. Add *extra reach* for fast, even dumping and you can see why production is higher with an Allis-Chalmers tractor loader. Let your dealer show you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

The "Big Three" tractor loaders range in size from the TL-14 with 5,300-lb carry capacity to the TL-20 (shown) with 9,000-lb carry. Each has a family of buckets—18 bucket loader combinations in all.

Now available in Persian Orange or Allis-Chalmers Yellow at no extra cost.



ALLIS-CHALMERS

. . . power for a growing world

In 1938—four bucket sliding scraper, working on the Trans Florida canal project.

1933 is the date of this photograph (or is it 1934?). Typical early 13.50 x 20 tires. Called the Model "B," it carried about 12 cu. yd. struck. Job was the townsite near Grand Coulee dam.

EARTHMOVING

Continued from page 79

Good Departmental Control

There is enough room in an earthmoving company to warrant putting talented people in each key spot. Bookkeeping, cost figures, regional management, job management, estimating, engineering, traffic, mechanical things, repairs, parts, purchasing, to name a few. Some particular person should know the particular function, people and needs of each activity, and help blend it into the desired, perfect whole. Every function is rightfully an effective part of the entire organization and often surprisingly affects it all—even including other seemingly unrelated departments. Through the separate channels can come the opinions of separately occupied people, to add to the company's business effectiveness. As remote as machinery buying seems from the interest of other workers, there may be an important tie-in that should be recognized and given consideration. Scrapers, for instance, may often be judged better with group opinion, than by the opinions of some one person—even though that one person has broad experience.

Good Earthmoving Spread

The tremendous earth yardages being moved today have created a special breed of folks. The business today is *big* business. It is a rough, highly competitive and costly business. It calls for aggressiveness, hard work and ingenuity. A goodly part of each of these qualities is centered in determining the right kind of equipment. The general requirements for a spread are about as follows:

Tractor-scraper groups. One or two are of little use, they must be bought like bananas—in bunches. The scrapers generally best today are those capable of protracted high speeds. This means the ones with large pneumatic tires and lots of horsepower.

More big tractors (crawlers) are needed to assist in loading—for ripping, bulldozer work, etc.

Smaller tractors are essential for general work—clearing, loading, leveling, sloping, tamping, etc.

A couple of motor graders are a "must." Their work is never-ending: blading, trimming slopes, leveling, cleanup, road building, and many other tasks.

A water wagon—or more than one—for sprinkling, maintenance, etc.

A half-dozen pickups for general hauling.

Cars for personnel use.

Work shop, for overhaul and repair work. Parts supply.

Engineering tools. Office tools.

Drilling and shooting equipment and supplies.

Some work areas for all of these. Housing, fixtures. And often much more.

The equipment spread is generally the Contractor's only stock-in-trade. His only other valuable assets are his people (if good) and his own skill and proficiency.

Such a spread as just outlined is little enough if you expect to meet all of the needs of most of the present-day jobs.

Even such a basic outfit as just mentioned costs considerable to own, whether in use or not. Every responsible person in the organization should have the cost figures at his command. Only with such figures, is anyone to know how much should be earned by the work spread—and how much the individual machine must earn to produce its share. The machines that receive pay for their functioning, must obviously pay all the bills and supply profits if possible.

If the earthmovers should be the income earners, then the earthmovers should be the best known units in the company. Their purchase must be wisely made. Their functions should be well considered and planned; their best production should be assured;

their production and costs should be known accurately, and carefully recorded. There should never be anything casual about anything connected with them. Here is the place for the specialist.

Job Specialization

The job superintendent should specialize in job requirements—in quantities, in procedure, the availability of enough equipment, the types of machines needed to do certain work, the men who will see that things are done. Each of his foremen must watch his respective responsibility: the pit, the haul roads, the grades, the fill, the machinery, shooting, watering, slopes, compaction. The engineers must continually make time-studies, weigh, check; watch slopes, grades and materials—study, analyze, estimate. Operators must watch the mechanical condition of their rigs, check performances, obtain the best possible performance and know how and why it was possible.

Cost accountants should know all of the expenses and costs of their company's operation and particularly the capabilities of the individual machine. This last is an exacting job for an exact kind of a man. His responsibilities are great and his counsel is very valuable for every function of the company.

This writer's recommendations are not those of a person heavy with book lore. They stem from intimate contact with hundreds of fine fellows in the earthmoving business. They are prompted by the earnest wish of a fellow worker to see such people do well.

There is no need for lack of top performance, or success, with earthmoving equipment. Every machine has a well defined function. Its adherence to that work and its potential are dependent upon people. True, different types of work will create different results, but any change in a machine's output is accounted for by the use of what the writer has referred to as Basic Principles. Every mechanical feature of a rig has a normal way in which it works, and will generally help produce a measurable unit of output. In order to anticipate a result with any machine, it is but necessary to know the machine and all of its functions intimately, then apply this knowledge to physical changes. Physical conditions, too (i.e., mud, or certain sands), have their rules of action which must be correlated often to the use of the machine in question. The friction, the rolling resistance, the weight, may change. These changes affect the tools chosen and their mechanical functions and performances.

An often-made remark by a scraper owner is, "We can't get the results out of those rigs that you fellows claim." Well, as honestly as the scrapers have been made, as honestly as their strengths and weaknesses studied, their performances and costs recorded, and the proper allowances made for human weaknesses, there should be no cause for failures to produce, or to meet anticipated costs. If a machine fails to produce, the failure can normally be charged to the inefficiency of the contractor rather than that of the scraper. If a machine's performance and its costs are known sufficiently, the application of the right factors, the right thinking, will indicate the successful application and the production to be expected—as well as help figure the costs of such production.

Such machinery has been experimented with extensively, has produced certain results consistently, with run-of-the-mill but experienced owners. This fact gives the performance an authenticity that must not be overlooked.

Thoroughly conclusive analyses of what machines can do should present conclusions as certain as the initial facts. There are no favorites in the attainment of such results. Certainly scrapers do not care for whom they work. If one set of people can get proper results from them, others can do the same.

In spite of well-intentioned selling and of earnest, honest efforts, if any machine does not meet the test of Basic Principles, it can fall far short of its expected performances and costs. Most of the differences of opinions and the distrust in products could be straightened out before they develop, if there was the better understanding of the use principles underlying the involved machinery.

There are many new machines that look much like older machines. The new design may be almost a matter of duplicating measurements, angles, metals. Overlooked are the refinements made possible, the niceties of physical proportions, in relation to field requirements. Many such refinements are proven to be necessary in order to produce a superior product. The extravagance of some advertising, the verbosity of extravagant terminology, can lead the unsuspecting astray. Only long, costly, non-producing periods of use will finally show the inadequacies that should have been apparent in the purchasing.

Good Manufacturers Easy to Spot

The equipment men aren't hard to spot who can cover all of the contractor's needs in offering him a complete package—good machines and adequate engineering information to help establish their superiority. Behind the best machines are good factories, superior craftsmen, advanced use of new metals, extensive research and field engineering, outstanding dealer representation. Once the performance principles are established for such machines, consideration of desirable adjuncts is greatly simplified and made accurate. Almost any make of machine will, or should, conform to proper calculations, or it violates too many time-proved principles around which those kind of tools are made and used. Further, any reputable dealer will give you proof of the ability of his product to meet the conditions claimed by him.

Good Dealers Important

It is well to look at the dealer's experience, in the materials handling business; his parts and service arrangements; at his selling policies; at his engineering and consulting services. His continuing activity besides disposing of his merchandise should be in keeping abreast of the time engineering-wise and product-wise. He should be able to offer broadly developed service and consulting men who are extensively experienced, familiar with the contractor and his problem.

This listing of a contractor's needed assets and helps

Continued on page 86

JOHN DEERE
720

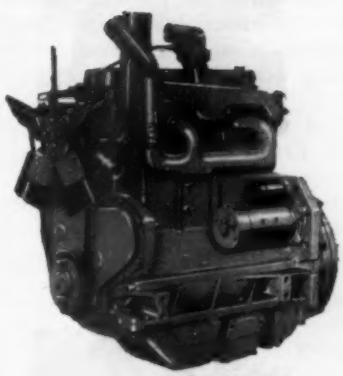
Get set for higher profits—lower bids with new high-production

3010 Wheel Power

Now—cut the big jobs down to size with an all new 65 engine horsepower John Deere "3010." Move into tough loading and material handling assignments with this smooth-handling wheel loader; tackle major trenching jobs confidently with a "3010"-powered John Deere backhoe.

New Operating Ease: Convenient controls boost productivity of the heavy-duty "3010" Wheel Loader and power-matched backhoes. Single-lever control operates loader lift arms and bucket for rapid handling.

John Deere backhoes operate with simple two-lever control. Flush-digging model 51 has rotary boom cylinder which centers or slides to any of four off-center positions, moved by the unit's own hydraulic power.



Gasoline or Diesel Power: All-new John Deere 4-cylinder, 4-cycle overhead valve engines feature cam-ground aluminum pistons, high-turbulence combustion chambers for thorough fuel-air mixing, top efficiency. Replaceable-sleeve design for easy servicing. Large manifold insures free breathing at every speed. Exclusive forced engine ventilation. Full-pressure lubrication system with full-flow oil filter. Exhaust-valve rotators.

Modern Platform, Control Design: Clean, functional "command post" assures all-day operator comfort and efficiency. Deluxe seat adjusts to operator's weight. Large clear platform makes mounting, getting down, fast and easy. Hydraulic controls conveniently located for smooth operation. Constant mesh transmission—8 speeds forward and 3 reverse, for any power requirement. Power steering, power brakes. Low-profile design provides high machine stability, excellent operator vision.

For a demonstration of new John Deere "3010" Wheel Power, contact your John Deere Dealer through the yellow pages of your telephone directory.

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JOHN DEERE LOADERS BULLDOZERS BACKHOES AND EARTHMOVING EQUIPMENT

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EARTHMOVING

Continued from page 83

may seem quite detailed, but most of the virtues mentioned are matters almost of routine in a good progressive organization. Surprisingly, in many superior groups, many of the obvious necessities are glossed over or missing.

Know Scrapers

Let us make the assumption that scrapers are suitable to the conduct of the business as planned. Further, let's say those chosen are as good as obtainable. Lest all of this seems heavy with preparation, let the writer remind the reader that only by understanding all of the problems is it possible to obtain the refinements of best performance and costs.

Tracks or Rubber for Power Source? The choice of scrapers—in contrast with selecting wagons or trucks for instance—can be a major choice for a job. Should the scrapers be crawler operated, or on rubber? What size? Horsepower? Speeds? What auxiliary equipment? How handled in the pit? On the haul roads? Grades? What is the material, its weight? Swell? What method of loading? What are the hourly costs? How efficiently will they work? How about weights and its distribution?

All of these factors have their influence on final results. Let us look at some of them.

Crawler spreads are capable of protracted self operation, movement over grades and rough terrain that almost rules out rubber tires.

The size depends largely upon the means of loading. Get it in relation to weights and horsepower and the loading help. In order to have suitable performance, the present horsepower-to-weight ratio should not be in excess of 350 to 400 lb. at sea level.

Speeds. Good ten-speed and power-shift transmissions are now available, and speeds should range from about 2.5 to 36 or 38 mph, with 40 mph or more on some 3-axle models.

Extra equipment: Power shift, weight transfer, dealer modifications appropriate to the area in which the scrapers will work—maybe a hydrotarder.

Pit handling: In keeping with terrain, needs, etc. The rubber-tired scraper is best loaded with pusher help. A critical choice for maximum results.

Haul roads, grades: These can be arranged to give the best possible performance.

Material weights, swell: Very critical in the determination of performance and costs. Most important.

Loading time: This can be determined, and should be.

Hourly costs: Keeping of costs should be in charge of a very exacting man. It is another critical item in the success of an earthmoving company.

Efficiency: The 50-minute hour is always good.

Weights: Important for calculations of performances and costs, analyses, etc.

As important as scrapers are to the general scheme of earthmoving, the area in which to start their effectiveness is in the borrow area or pit. They cannot handle any more dirt than can be loaded into them, so the loading time and amount are important and so is the means by which this end is obtained. This immediately points to the pusher, which will be analyzed in Part II of this review.

Airport Wins ASCE's Achievement Award

New York International Airport has been selected by the American Society of Civil Engineers for 1961 as the Outstanding Civil Engineering Achievement of the Year. It was one of 11 nominations in the competition, which in 1960 was won by the St. Lawrence Seaway and Power Project. Judging was by a jury of engineering magazine editors, ratified by the Society's Board of Direction. The jury decided that the civil engineering involved in New York International is of a magnitude unprecedented in the history of airport planning, design and construction.

The award plaque will be presented to The Port of New York Authority, which developed and operates the airport under a lease with the City of New York.

A total of $288 million had been spent on construction of this 4,900-acre field, which serves 16 domestic and 22 foreign airlines through the airport's core, Terminal City, with its 10 terminals. The field now includes five runways and 20 miles of taxiways.

New York International Airport selected by ASCE as the outstanding civil engineering achievement of the year.

Job Safety

Glowing Hard Hats Provide Added Safety

Phosphorescent helmets have been issued to the entire field force of Malan Construction Corp., New York, N. Y., at one of this firm's large eastern jobs. The contractor said the hard hats, which are always worn as protection against any falling object, have the added advantage of throwing off a blue-green glow in darkness. Malan executives see this as another safety factor. The helmets make men more visible when working in deep excavations or in dark areas such as tunnels or under formwork.

Malan Construction purchased fiberglas hats from the Fibre-Metal Products Co.

Job Accident Prevention Booklet Available

"The Big Payoff" is a new publication aimed at selling employes on the value of their companies' accident prevention program. The 12-page, four-color cartoon pamhlet has some straight talk about how employes benefit from being active in a safety program. For further details write the National Safety Council, 425 North Michigan Ave., Chicago 11, Illinois.

New Safety Pamphlet

"Who gets hurt in industrial accidents?" is a question asked—and answered—by a new pamphlet by the National Safety Council. The pamphlet, "Who Gets Hurt?" uses a humorous approach, multicolored cartoons and concise text to discuss on-the-job injuries.

The 16-page pamphlet explains the type of worker most likely to be accident-prone, how workers and their families are hurt in accidents, where accidents happen, what injuries cost the worker and his family, and what you can do about accidents.

A single copy of "Who Gets Hurt?" may be obtained free from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Hook an OWEN Clamshell Bucket to your crane and you're *sure* of superior performance and longer life. For OWEN Buckets have exclusive super-efficiency and long-lived features you won't find in ordinary clamshells.

For instance:

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For over half a century OWEN has been building clamshell buckets—tailored to meet the requirements of "men who move the earth the world over".

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THE STEEPER THE GRADE...

the more "extra" loads a cycle-gaining Payhauler® gives you

Of all three 27-ton off-road haulers, only the International 95 Payhauler gives you the weight-shedding, strength-multiplying advantages of the rock-ribbed, corrugated body. Only the "95" is plus-powered by the 375-hp DT-817 turbocharged Diesel. And only the "95" gives you an exclusive combination of power-control, safety, and comfort features that turns haul-speed advantages into extra haul-cycles! *Prove to yourself* what comparative grade charts and work-tally sheets show! See your International Construction Equipment Distributor for a Payhauler demonstration!

Positive Torqmatic braking gives the operator complete control of this fully-loaded "95"—builds confidence to use the highest practical haul speeds, even when hauling down the steepest grades. "One-hand" power-steering teams with finger-tip brake lever control to give course-holding, grade-matching downgrade hauling stability. Torqmatic braking, standard equipment on the power-shift "95," is a Payhauler *plus*—furnished in addition to the standard, internal-expanding wheel brakes—to help give you "*extra*" loads on tough hauls!

Grade charts prove: only the 95 Payhauler delivers

Total grade and rolling resistance, 10%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	10.2	
Competitor X	8.0	27.5%
Competitor Y	8.0	27.5%

Total grade and rolling resistance, 11%

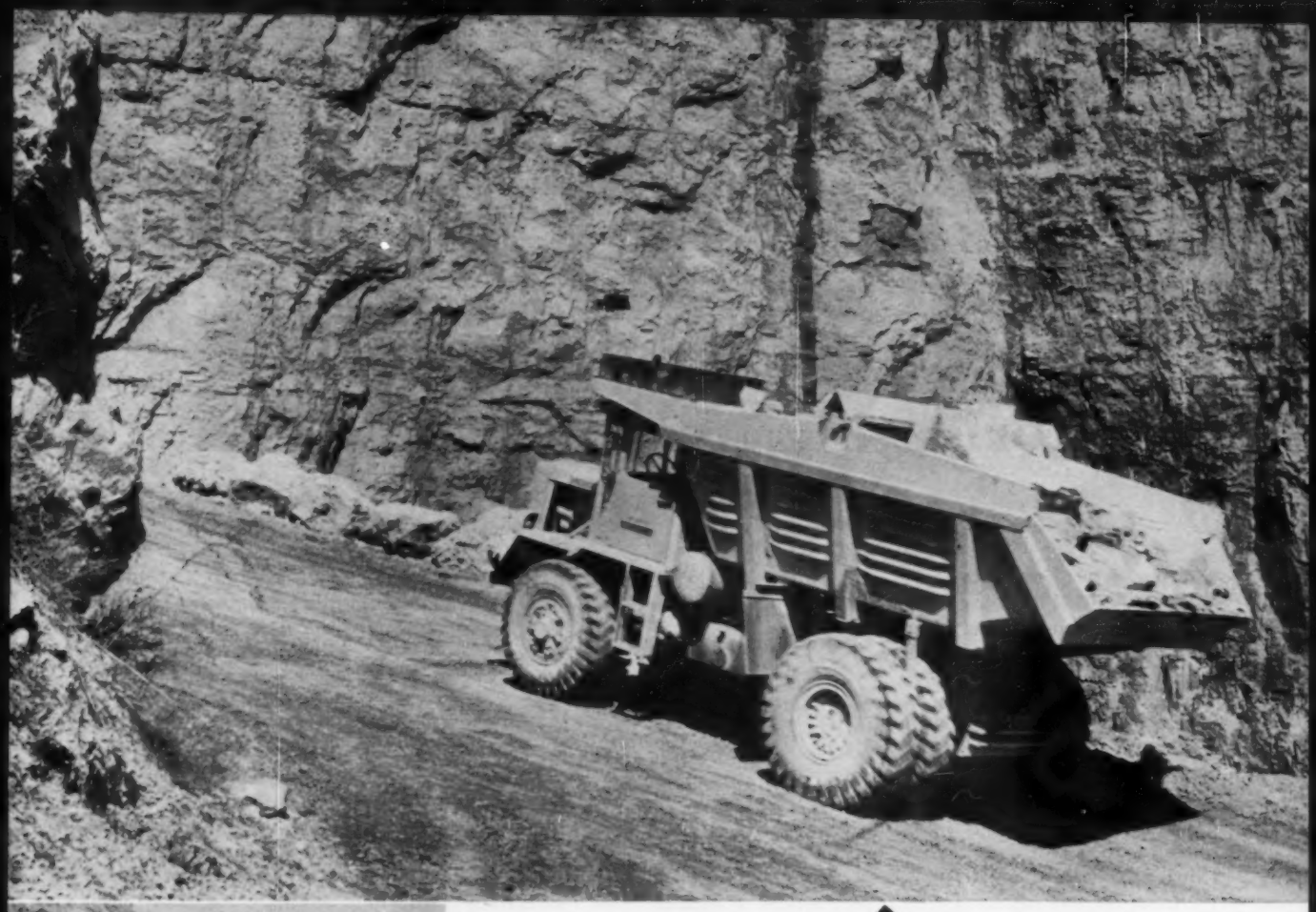
Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	10.1	
Competitor X	7.0	44.3%
Competitor Y	7.5	34.7%

Total grade and rolling resistance, 12%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	9.0	
Competitor X	6.3	42.9%
Competitor Y	7.0	28.6%

Total grade and rolling resistance, 13%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	7.9	
Competitor X	5.5	43.6%
Competitor Y	6.0	31.7%



Two 65 Payhauler rigs speed full 19-ton loads of dolomite from quarry to crusher—up a maximum climb-out grade of 16%. Powered by the 250-hp naturally aspirated "817" Diesel—equipped with weight-shedding corrugated steel body—the "65" consistently hauls 30% faster than competitive rigs! Price the "65"—you pay less per hp, less per struck yard and per ton of capacity than for competitive rigs!

Three 95 Payhauler trucks replace five competitive haulers in a large Chicago-area quarry. Reasons: fully-loaded "95's" haul upgrade as much as 44% faster than the competitive make—give fast, "big-target" loading—dump in only 11 seconds with exclusive power-up and power-down hoist action. And the cycle-gaining "95's" with Torqmatic power-braking, power-steering and power-shifting deliver "extra" loads on steep hauls!

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POWER PACKAGE

***International®
Construction
Equipment***

"extra" loads . . . over any 27-ton competitor

Total grade and rolling resistance, 14%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	7.2	
Competitor X	5.0	44. %
Competitor Y	5.5	30.9%

Total grade and rolling resistance, 15%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	6.4	
Competitor X	4.8	33.3%
Competitor Y	5.3	20.8%

Total grade and rolling resistance, 16%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	5.8	
Competitor X	4.6	26.1%
Competitor Y	5.0	16. %

Total grade and rolling resistance, 17%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	5.4	
Competitor X	4.5	20. %
Competitor Y	4.9	10.2%

Ohio River Bridge Spotlights Fabricating Advances

The first bridge fabrication job in the U.S. to utilize numerically controlled machining is reported by the R. C. Mahon Co., Structural Steel Division in Detroit. This shop refinement is speeding work on the $14 million bridge which will span the Ohio River at New Albany, Indiana.

Designed by Hazelet & Erdal, consulting engineers, the New Albany bridge marks the initial use of 100,000 psi yield strength steel for bridge construction. It is a 1,600 ft. tandem double-deck tied arch. Mahon holds the contract for the entire $5.4 million superstructure.

The New Albany Bridge exhibits outstanding progress in design, use of materials and fabrication techniques. Numerically controlled machining, one of the major innovations in the fabrication, is performed on an automatic drilling machine designed and built for Mahon by Walter P. Hill, Inc.

Cost saving of 85 percent in producing holes are reported with the firm's new tape controlled drill. The saving comes from elimination of hole pattern layout operations, from higher speed drilling, and from automatic conveyorized feeding of beam and column sections into, through and out of the tape controlled drilling machine.

The firm's conventional radial drilling and various methods of punching are also being replaced by the faster and more accurate Hill automatic drilling machine. The high accuracy and hole pattern repeatability of numerically controlled drilling will eventually eliminate all costly reaming operations on detail plates as well as columns, beams and built-up sections.

New Design Methods

The structural design work of the Hazelet & Erdal staff is also noteworthy. For the statically indeterminate arch the engineers used a large computer to re-analyze the entire truss with a minimum of effort for each change made during the design stage. They also used the computer in determining secondary stresses and deflections through the use of special computer programs developed for this bridge. The erector company was also provided with basic computer data from which they prepared their erection schemes and determined stresses and joint displacements for the various erection phases.

The tied arch design of this magnitude makes the use of high strength steel very desirable, if not mandatory. Therefore designers selected low alloy, heat treated, high strength steel, T-1 and N-A-Xtra 100, for the tie and also in arch trusses where these materials proved economical. Similarly, intermediate strength A242 steel was proposed for floor beam frames and truss members on the basis of economy. The remaining members were specified as A7 and A373 mild steel.

Since all of the steels selected are weldable, further economies are gained with welded fabrication for all major components and the use of high-strength bolts for field connections. Estimated savings through the use of several grades of steel and welded fabrication, as compared to methods and materials of only a few years ago, exceed $¾ million in the main spans. This saving is apparent in the fact that the net cross sectional area of the welded high strength steel tie, with a stress of 5400 kips, is 125.3 sq. in. The use of a riveted silicon steel tie, on the other hand, would require a net section of 245 sq. in.

Bridge Fabrication

Because no welding materials which were considered entirely satisfactory existed for the welding of the high strength, low alloy, heat treated steel, Mahon's structural steel division developed the welding wire and flux to meet the 100,000-psi requirements. Improved welding techniques and new equipment are further reducing the fabrication costs of the New Albany Bridge. Essentially all manual electrode equipment in the shop is being replaced with high-speed mechanized and automatic submerged arc units. New tandem arc automatic welders save up to 80 percent on welding operation time when compared with manual units. This equipment plays an important role in cost reduction on nearly 57 miles of weld on the bridge.

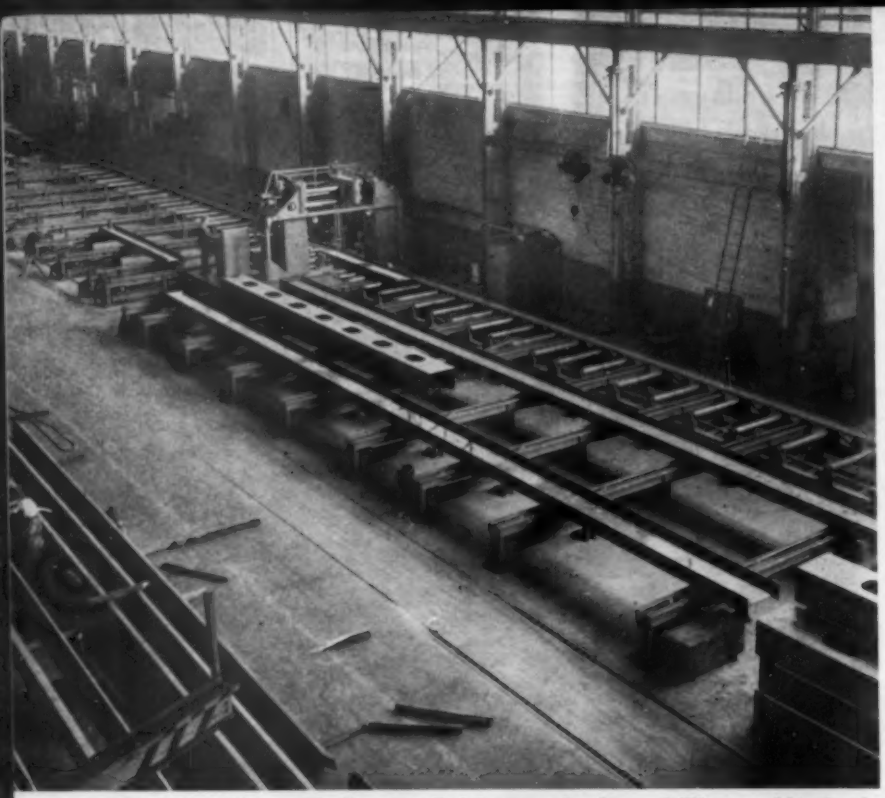
Bridge Erection

Erection problems were greatly simplified by the John F. Beasley Co., the erection subcontractor, through a plan for erecting everything from below. This is done with an oversized rig, believed to be the only one of its size in the country, with a 400-ton capacity and a 300-ft. boom. Extending 270 ft. above the water at normal pool, the bridge arches are easily handled with this rig.

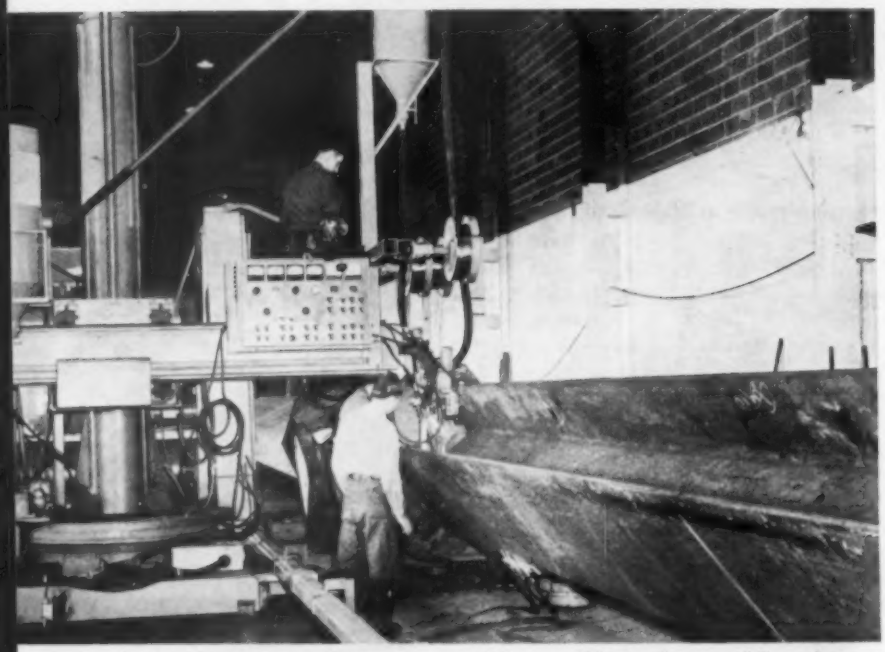
Because the erection is handled

One of the New Albany Bridge trusses during trial assembly at Mahon's plant.

New Albany Bridge over the Ohio River—the main span is a double-deck tied arch design.



The new Hill numerically controlled beam and column drilling machine in the Mahon plant.



Automatic tandem submerged arc welding machine reduces welding time on bridge components by 80 percent.

from below, the need for a traveler working the top chord is eliminated. As a result, for erection purposes, only four members are being modified in each truss, other than extensions of certain gusset plates to facilitate tiebacks. The extra amount of steel that will remain in the bridge as a result of this erection scheme is only 16,600 lb. This is about 1/10 of one percent of the total steel weight and is almost negligible when compared to the extra steel required when conventional erection methods are used.

Traffic Safety

Jersey Pike Reports Low Accident Rate

In a report on operations for 1960, a total of 49,083,000 revenue vehicles used the New Jersey Turnpike, up 6.2 percent from 1959. The overall safety record showed improvement with 1,020 accidents of all kinds, or 71.8 per 100 million miles, compared to 78.0 There were 749 injuries, against 817 in 1959. The 1960 fatality rate was 1.62 per 100 million vehicle-miles.

Construction Job Signs Reviewed in Michigan

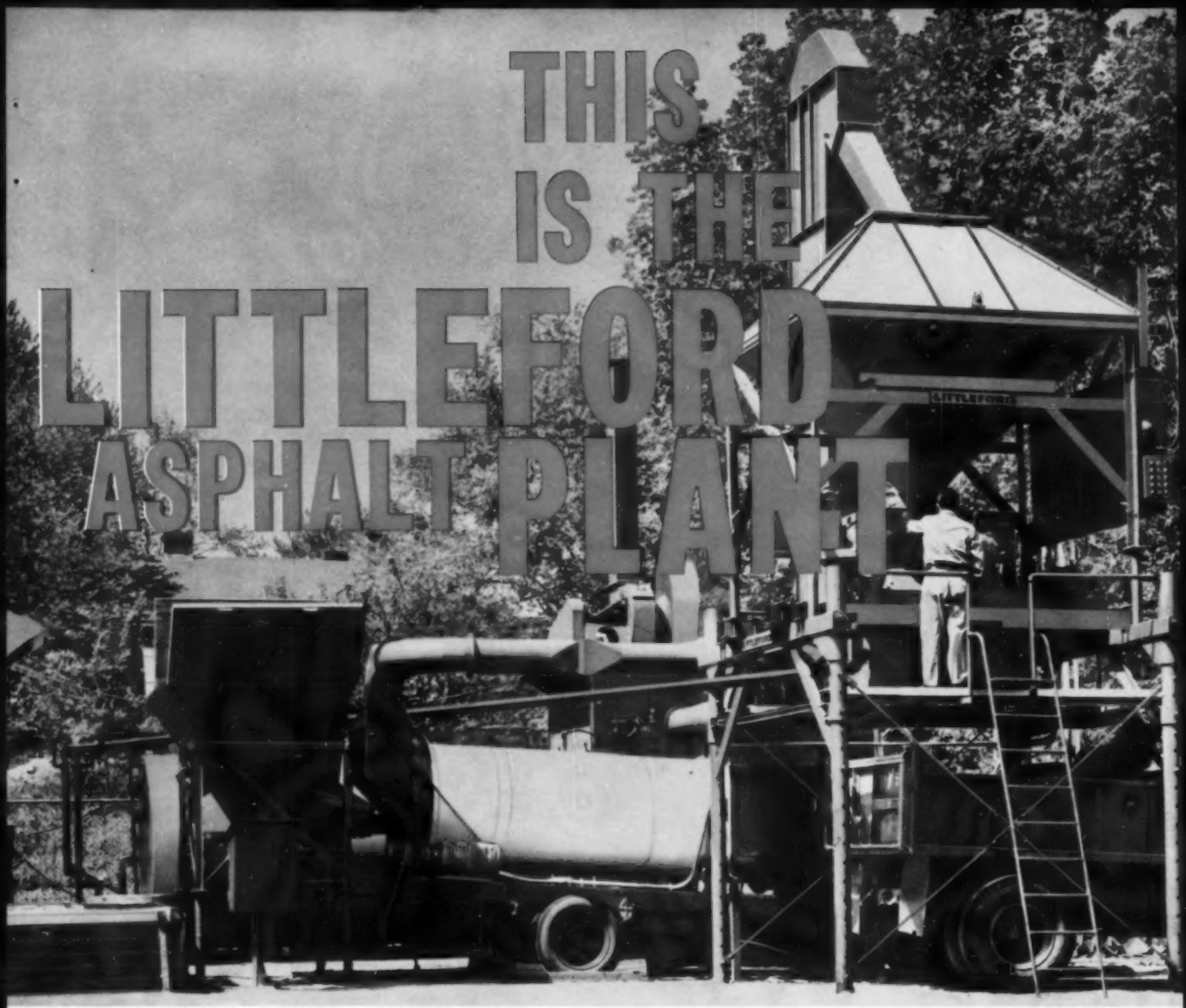
A safety review of Michigan state highway projects was made late in the 1960 autumn. The purpose was to see whether proper warning signs, barricades and lights were being provided to protect the motoring public.

Highway commissioner John C. Mackie said the high number of fatalities on autumn weekends prompted the checkup. All active road jobs were ordered inspected by district construction and traffic engineers. Also project engineers will subsequently make periodic inspections of jobs where work has been suspended for the winter, to make certain no hazardous conditions have been overlooked.

Light Change Cuts Intersection Accidents

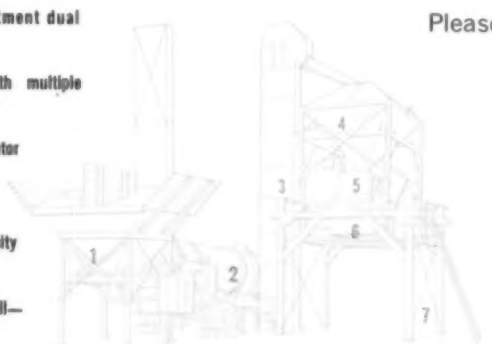
In Michigan a state highway department study reveals a sharp drop in accidents at an intersection in New Haven (Macomb County) after a "stop" and "go" signal was replaced by a "flasher" light.

A one year "before and after" study showed accidents fell from 27 to 7, and injuries from 23 to 3 after the flasher was installed at a junction of US 25. Highway traffic engineers said the "flasher" light caused a drastic reduction in the number of rear-end collisions at the intersection—the main cause of most of the accidents when the "stop" and "go' light was in operation.



The rugged Littleford Asphalt Plant is built to do the job . . . gives big plant quality mixes at small plant costs. Savings of 40% on producing bituminous black top are possible because you control the mix from pugmill to pavement. No more costly delays and waiting for trucks to arrive with the hot mix . . . with the Littleford Model 121-30 you have a plant with the flexibility and versatility to produce all types of black top mixes at the lowest possible cost. Only the Littleford Plant incorporates so many new and improved designed features and offers such a complete line of auxiliary equipment for you to custom-make a plant for your operations. You receive all the profits with **A LITTLEFORD MODEL 121-30 ASPHALT PLANT.**

1. 5-ton, 2-compartment dual feeder bin
2. 30-ton dryer with multiple flight construction
3. Enclosed hot elevator
4. Storage Hopper
5. 10 cubic foot capacity Batching Hopper
6. Twin Shaft Pugmill—1000 lb. batch
7. Self-elevating platform



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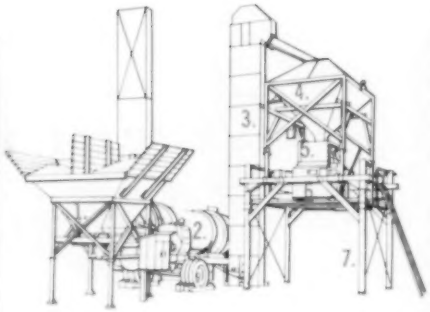
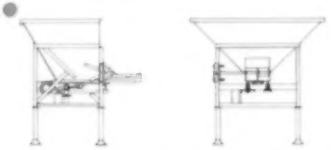


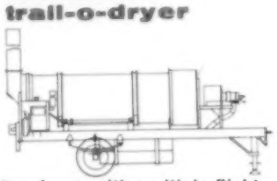
The Littleford plant incorporates many new and improved designed features that are not found on any other plant of this size. No other plant has the complete line of auxiliary equipment for you to custom-make a plant for your operations . . . you receive all the profits.

1. model 5-t-25 dual feeder bin



The 5-ton, two compartment dual feeder bin has a reciprocating feeder which feeds the aggregate in predetermined amounts directly into the dryer.

2. model 30t trail-o-dryer

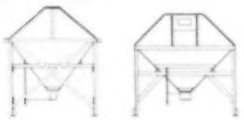


The 30-ton dryer, with multiple flights construction, produces an "Even-Veil" of aggregate across the drum permitting quick drying, and heating of the aggregate. The combustion area is constructed of tough, heat resistant "Cor-Ten" steel. Fuel oil or gas burner available.

3. model he-30 hot elevator

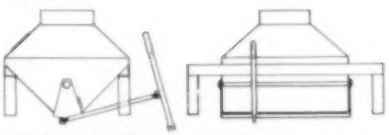
The enclosed hot elevator delivers a continuous cascade of hot, dry aggregate from the dryer to the storage hopper at a rate up to 30 tons per hour.

4. model sh-100 storage hopper



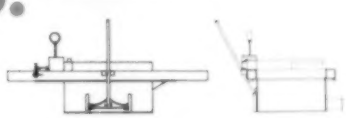
Storage hopper holds and discharges dry aggregate into batching hopper.

5. model bh-10 batching hopper



Batching hopper has a 10 cubic foot capacity (1,000 lbs.) for measuring one batch for the pugmill. Weighing scales available if desired.

6. model pm-10 pugmill



The twin shaft pugmill equipped with adjustable paddles is positioned directly below the batching hopper. An asphalt flow meter determines the correct amount of asphalt pumped into the pugmill.

7. model ep-30 elevating platform

The self-elevating platform permits discharging of bituminous black top directly into waiting trucks.

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INTEGRATED CONTROLS that serve both as clutch operating levers and as engine throttles, providing variable speed control over each function. Clutches, being responsive to lower range of control pressures, are engaged before engines are accelerated. Slippage and overheated friction surfaces are eliminated, lengthening clutch life appreciably.

HOIST AND DRAG DRUMS ARE INTERLOCKED to automatically synchronize their operation. Cycle time is faster and output is greater because full horsepower is always available for hoist—the operator doesn't "soak" it up with the drag brakes. Operating costs are noticeably less because brake use is cut by 50% and lining wear is drastically reduced. Another advantage of the VICON interlocked drum arrangement is that the operator can "power lower" or free-cast the bucket.

DUAL INDEPENDENT ENGINE POWER with one engine powering the main drums, and the second all other functions. Here are all the advantages of electric or conventional diesel engine mechanical drive without the disadvantages of each. You get the performance characteristics of electric drive — smoother power flow, variable independent speed control, simultaneous operation of dig, hoist, swing, and propel functions—without sacrificing mobility, without incurring the headaches and special maintenance problems of electric drive, without needing a separate power source at every job site. You get the simplicity of mechanical drive without losing valuable production time because of engine "lug down", without needing to jam clutches into engagement at high and harmful engine speeds, without the limitations of operating speeds that are inherent in conventional diesel engine drive.

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Placing of concrete for the new slab, as well as removal of old concrete, had to be planned with particular care for the suspended spans due to the problem of keeping weight balanced.

Stay-in-Place Forms Simplify Bridge Deck Reconstruction

Progressive and severe deterioration of the 28-year-old deck of Toledo's Anthony Wayne suspension bridge over the Maumee River reached a crisis early in 1959. City maintenance workers who had been patching the deck over the past few years, found that while clearing out sections as large as 5 ft. square for repair, they penetrated completely through the concrete slab.

This deck dates from 1931 and was resurfaced with asphaltic concrete in 1946. Clearly it was seen to be ready for retirement. Until something was done, traffic had to be limited to 20 mph and all trucks over 6,000 lb. weight barred.

A report on the causes of deterioration and recommendations for repair was asked for by the city from Hardesty & Hanover, consultants of New York City.

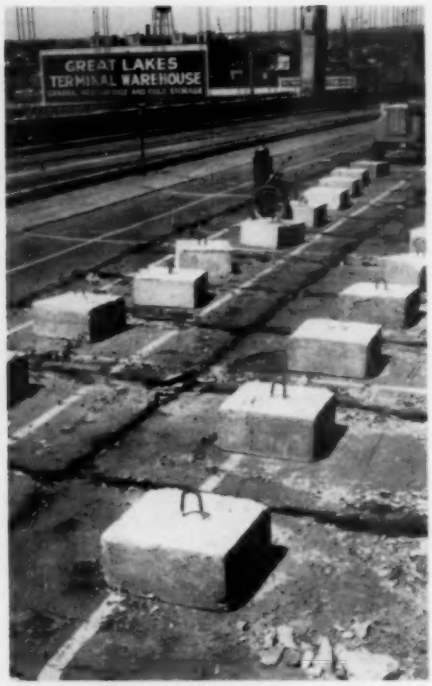
Crane is loading out a 5 x 9 foot fragment of old pavement slab, just cut from the far side of the deck. Near side remains open to traffic. →

After tests, both in the field and in the laboratory the firm reported three causes for the deterioration:

1. Expansions due to chemical reactions between alkalies in the cement and highly reactive aggregates in the deck concrete.
2. Expansions due to the freezing of water after it had seeped into the slab.
3. Expansions due to the crystallization of salts used in de-icing the bridge deck.

It was determined that repair was impracticable. Complete removal and replacement of the deck of the main spans and approaches was recommended. Sanzenbacher, Miller & Brigham, Consulting Engineers of Toledo, were retained shortly after the report was filed on June 11, 1959, to prepare construction contract plans and specifications for bridge repair.

The asphalt was knifed through in 5 x 9 foot rectangles for pavement removal, an Ottawa Hydra Hammer used to break out the slabs.



Concrete blocks in position on the deck of the suspension span, as weights to offset removal of the old pavement and deck concrete.

After a field check, these major improvements were recommended:

1. Remove the bridge floor slab and construct a new 8-in. reinforced concrete slab.

2. Sandblast the structural steel framework in those areas subject to corrosion due to salting operations, and repaint the entire structure.

3. Repair both abutments damaged by water seepage through the back walls.

4. Install a complete new lighting system, including new tower lighting.

5. Miscellanous other improvements, such as a new bridge tender's building, new approach sidewalks in some areas, additional bridge slab expansion joints, additional larger scuppers, and shear connectors on certain stringers.

Included in the bridge floor removal and replacement were the 233.5-785-233.5 ft. three-span suspension system; a truss span and 15 deck girders in the 1061 ft. easterly approach; and one deck truss and 8 girder spans in the 901 ft. westerly approach.

The 4-lane roadway with median is 54 ft. wide, face to face of curbs. There are also two 6-ft. sidewalks.

Traffic maintenance during the repairs was a necessary complicating factor due to the bridge's strategic location. The bridge was carrying normally about 30,000 vehicles daily. The two nearest alternate river bridges carried 30,000 and 40,000 respectively, precluding the possibility of a major traffic shift during the repair work. Therefore the specifications stipulated that two continuous traffic lanes, not less than 10 ft. wide, should be maintained at all times.

The decision was made to close the north side first, confining traffic to a single lane in each direction on the southerly side. That this scheme was workable was shown by a traffic count during the job: Anthony Wayne bridge still carried 26,282 vehicles daily; nearby Cherry Street, 28,266, and Craig Memorial, 44,092.

New Techniques Used

The necessity for strict economy led to the application of some techniques not before employed in the Toledo area. One was for the removal of the slab on the supported portions of the bridge. First, guide lines were painted on the asphalt surface of the bridge. to locate underlying stringers and floor beams. Then with the use of a Hydro-Hammer pieces of slab about 5 x 9 ft. were channeled out. Reinforcing bars were cut through by torches, and the freed slab crane-lifted by slings onto trucks.

This method made for clean and easy handling. And it did away with the necessity of placing nets or platforms under the deck to prevent large debris falling onto streets and railroad switching tracks under the bridge.

On the suspended spans, limitations were placed on the amount of slab which could be removed at one time. The quantity was restricted to the area which could be replaced in a continuous concrete pour within the time of the initial set of the concrete. Removals were made successively and each removed portion replaced before another portion was removed, to assure that each section might set up in as close to deadload position as possible.

Advance channeling was allowed before removal, but 800-lb. concrete

Up comes another "cookie" of old slab, aided by burning through the reinforcing.

Laying the stay-in-place form panels—one of the time and labor savers on this project. Troublesome under-deck work largely eliminated.

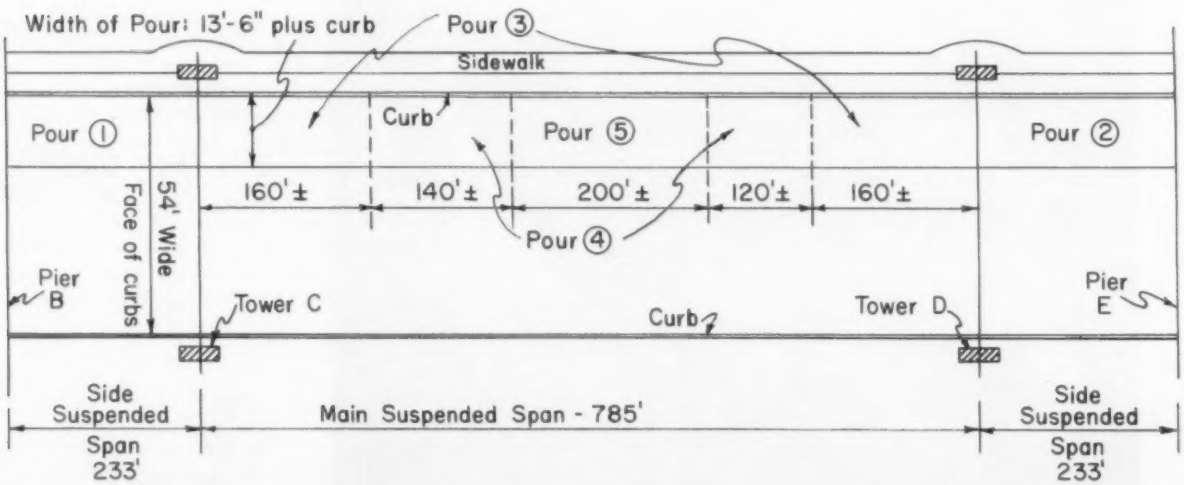
blocks (see picture) were placed on each channeled-out piece to compensate for material lost through channeling, so as to keep the bridge in its proper transverse deadload position. For the same reason, similar blocks were placed on the north stiffening truss of the bridge, after the pours, to compensate for lost material between the new pour and the old deck not yet worked on.

The accompanying diagram shows a typical pour sequence on the suspended spans. Four transverse pours were required for the entire roadway width. Stay-in-place type forms were utilized to reduce the labor of forming and eliminate the necessity of costly removal from suspended platforms under the structure, had conventional slab forming been used.

Some changes were made by Sanzenbacher, Miller & Brigham from the original design based upon their field investigation and in light of current practices. Believing that better drainage would result in easier maintenance and extend the useful life of the new floor slab, the consulting engineers increased the crown of the roadway and designed new drainage scuppers.

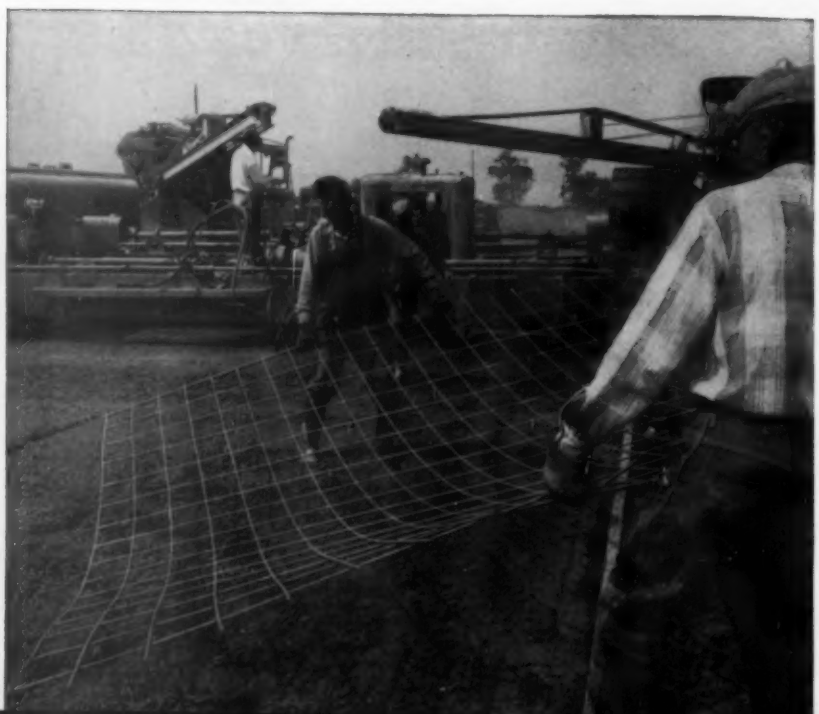
With the additional scuppers, the drainage pattern is now such that

Continued on page 103



Concrete removal and new-concrete pouring schedule for the suspended spans of the Anthony Wayne Bridge at Toledo.

Steel reinforced ...to stand up



PROJECT: Portion of Northwest Expressway just west of Cumberland Avenue Interchange, Cook County, Illinois

OWNER: Cook County Department of Highways

CONTRACTORS: Arcole Midwest Corp., Evanston, Illinois

WIRE FABRIC DISTRIBUTOR: E. W. Zimmerman, Inc., Chicago, Illinois

This mark tells you
a product is made of modern,
dependable Steel.

under the hi-speed pounding of modern traffic

Cook County, Illinois has opened the first section of its new Northwest Expressway. And, like other expressways built under the authority and supervision of that county's Department of Highways, it is steel reinforced.

An anticipated daily count of 31,000 vehicles is expected on this newly opened 4½-mile section which extends from Foster & Central Avenues to the Illinois Toll Highway. This figure indicates what this already busy strip will be subjected to as the traffic load gets heavier. And it points up the importance of building into all new roads and highways the strength it will take to stand up under the almost ceaseless pounding of modern hi-speed traffic in the years ahead.

Highways reinforced with steel have a balanced design in that all edges and corners are fully protected. USS American Welded Wire Fabric accomplishes distributed load transfer and reduces stresses about 30% which accounts for the truly superior performance of reinforced concrete over non-reinforced concrete. Reinforced pavements provide a safe, smooth riding surface that lasts.

USS American Welded Wire Fabric is today stronger than ever. Minimum tensile strength is now 75,000 psi and minimum yield point is now 60,000 psi. It has reserve strength for heavier pounding and it is available in a completely machine fabricated form, ready for immediate placement. For more information, write to American Steel & Wire, 614 Superior Avenue, N. W., Cleveland 13, Ohio. *USS and American are registered trademarks*

American Steel & Wire
Division of
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Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

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Who's Hanson?

Hanson built the first full revolving ⅜ cubic yard gasoline powered shovel in the United States.

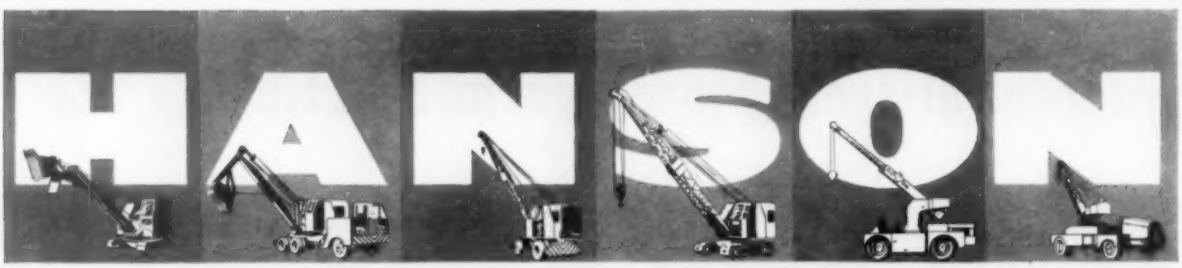
Ever since then Hanson has been building some of the country's finest shovels and cranes of the smaller capacities.

During World War II Hanson built heavy machinery trailers for the Engineers; torpedo cranes, minesweeping cranes and crawler cranes for the Navy.

During and after Korea Hanson built ¾ cubic yard, 20 ton truck mounted cranes for the Engineers and the Air Force.

After World War II and again after Korea Hanson had to make extensive additions to its plant capacity to keep up with the demand for its fine quality equipment. In a word, Hanson is one of America's outstanding smaller companies engaged in the manufacture of excavators and cranes.

Yet with all this—and all through the years from 1914 when the firm was founded—Hanson has tended to hide its light under a bushel. Its conservative, engineering minded management has concentrated on building a better mousetrap and has done very little shouting from the house tops. Though known and respected, Hanson is not as well known as it could be.
Or *will* be. For Hanson has acquired new owners and new managers

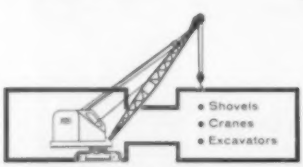


who are firm believers that in this competitive day and age it pays to advertise. Henceforth Hanson will not only build the finest excavators and cranes that money can buy but will tell the world so. Henceforth you can expect to see regular messages in this and other magazines telling the Hanson story. We're proud of Hanson, proud of Hanson machines, too proud to have anyone ask, "Who's Hanson?"

These dealers proudly sell and service Hanson excavators and cranes. Dealerships in other areas are open. Write for details.

EXCAVATORS
Crawler, rubber and truck mounted: ⅜ to 1 yard shovels; 5 to 25 ton cranes.

YARD and DOCK CRANES
Mechanical and hydraulic. 3, 5 and 6 ton.



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ERIC HEILO COMPANY
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E. D. FARRELL CO.
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Buffalo 10, N. Y.

INDIANA SHOVEL & SUPPLY CO.
5357 Massachusetts Ave.
Indianapolis 18, Ind.

MERRITT EQUIPMENT SERVICE
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East Point, Ga.

H. J. MOYLAN & SONS, INC.
Key Highway & Woodall St.
Baltimore 30, Md.

GEORGE PARK TRACTOR CO.
3809 Broadway
Macon, Ga.

WM. F. SURGI EQUIPMENT CORP.
P. O. Box 1309
New Orleans 10, La.

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Showing first lane in place for the initial half-width reconstruction, with reinforcement in place for lapping at lane longitudinal joining.

Temporary wood platform built between girders to catch debris, which otherwise would have showered on the street and railway track below.

New concrete in place on the far side, traffic continuing to flow on near side.

STAY-IN-PLACE FORMS

Continued from page 99

most water is intercepted prior to reaching expansion joints.

The new 8-in. slab was constructed under a modified form of the State of Ohio Department of Highway's specification. Cement dispersing materials are specified to improve workability of the concrete, and entrained air of not less than 5 per cent nor more that 7 per cent was required.

Because of the bridge's exposure to weather, a retarder was called for to be used at the direction of the engineer during hot or dry, windy weather. The specifications also required erection of wind barriers if in the opinion of the engineer they were necessary to retard the drying effect of the wind. A combination curing compound and sealer was used for the finished slab.

Structure Painting

Painting specifications were novel in that a basic paint system was specified in the base bid, with two alternate systems. The basic specification was written in such a manner that most all paint manufacturers could, if they desired, manufacture the paint with little difficulty. In general, it consisted of a wash coat of basic zinc chromate and vinyl butyral and a primer, and two coats of basic lead silica paint.

The alternate systems were for graphite paint and anti-corrosive bakelite and rubber asphalt paint. An alternate low bid involving the graphite paint system was accepted. A prime coat of red lead graphite was applied first; secondly an intermediate coat of aluminum graphite paint, and a finish coat of bright aluminum graphite paint was applied finally.

Miscellaneous Notes

Shear stud connectors were welded to the structural deck system of certain approach spans, to increase the bond between the structural steel and concrete floor slab.

A completely new bridge lighting system includes new conduit, new lighting standards and modern high efficiency mercury vapor luminaires. Standards spaced at about 140-ft. staggered intervals have 8-ft. upsweep arms that carry the luminaires out beyond the curb line for

proper roadway illumination. The new lights replace the old incandescent type equipment which had short arms extending only over the sidewalk area.

Sections of the abutments at both approaches were repaired by a method used for the first time in Toledo. After removal of disintegrated concrete, where the depth to be treated exceeded 3 in., the prepacked method with grout forced in under pressure was used. If less that 3 in., gunite repair was employed.

The contract for the repairs was awarded in April, 1960, to Lathrop Company, Toledo, on a low bid of $1,284,995. Repair work was done virtually on a round-the-clock operation. Removal and replacement of the north two lanes, the curb, and the sidewalk were begun on June 29 and completed on October 24. The job will be completed during the 1961 season.

Frederick C. Miller is consultant representative in charge of the project. Elmer R. Brigham, electrical engineer with Sanzenbacher, Miller & Brigham, in cooperation with the Toledo Edison Co., designed the new bridge lighting system. City officials involved in the bridge modernization include Mayor Michael J. Damas, John R. Alspach, city manager; Leonard Leis, service director; and John Davis (deceased) commissioner of harbors and bridges.

Court Decisions

Homes Damaged By Pile Driver

The construction company contracted to build the approach to the Philadelphia end of the Walt Whitman highway bridge across the Delaware linking Philadelphia and Camden, New Jersey. During the work the firm was sued by the owners of three small houses, badly damaged during the driving of piles with a steam hammer; the hammer had a driving force of 16,000 lb. 60 blows per minute. Before the work began, the 30-year-old houses were inspected by the construction company's engineer and were photographed. The damage resulted when piles were driven to a depth of 36 ft. at points as close as 2 ft. from one property and from 17 to 29 ft. from the others. Trials in the Court of Common Pleas resulted in verdicts in favor of the homeowners, and the construction company appealed to the Supreme Court of Pennsylvania.

That Court affirmed the judgments holding that the construction company was guilty of negligence, on the premise that it should have known that the driving of the piles with such heavy equipment so close to the houses would cause vibrations that would damage them. The task of writing the opinion was assigned to Justice Michael Angelo Musmanno, not only a judge but the writer of a number of popular books, whose style of writing is much livelier and sparkling than that found in most legal opinions. In this case he said in part:

"A pile driver, when properly harnessed and kept within the channel of its legitimate functions, is, like a steam shovel or a bulldozer, a mastodonic mechanical creature assisting man in laudable conquest over obstacles holding back worthy enterprises in civilization's progress, but a bulldozer with an unsteady hand at the wheel, can leave its prescribed route of travel and reduce adjoining structures to tin and kindling wood. The vibrations of a pile driver can be as damaging as the gigantic blade of the bulldozer if the operator ignores the existence of structures within the sweep of its invisible fulminations.

"A giant striding by a kindergarten should tread softly. A pile driver operating in the vicinity of frail or unsubstantial structures should restrain or mask its thunderous blows to the extent necessary to avoid inflicting avoidable damage."

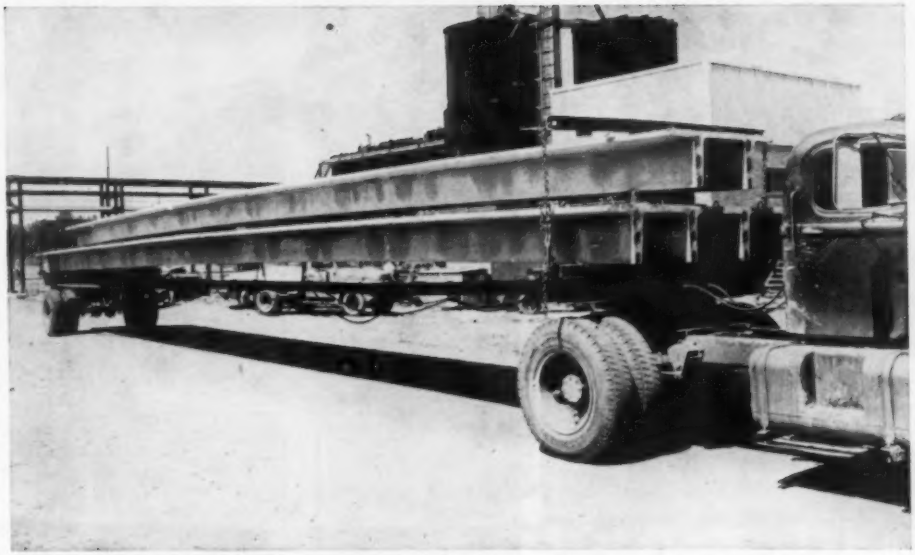
"The fact that the pile driver itself did not come into physical contact with plaintiffs' houses does not exonerate it from responsibility. Its invisible tentacles of terrestrial violence struck at the houses as certainly as a cannon shot hits its target. A pile driver whose operator ignores the presence of dwellings within the periphery of its vibrations is as responsible for the resulting damage as the bulldozer which leaves the road and knocks down adjoining buildings." (Dussell v. Kaufman Construction Co. 157 A 2d 740.)

Landslide Damage

A Pennsylvania homeowner, whose home had been engulfed and destroyed by a landslide, brought suit against a highway contractor and the two public bodies for which the highway was being constructed, claiming that the landslide was the result of negligence in planning and carrying out the job. The jury in the trial court returned a judgment in favor of the homeowner, and two of the defendants (the contractor and one of the municipalities) took an appeal to the Pennsylvania Supreme Court.

They based their appeal on the ground that they had been charged with negligence in "laying out, designing, widening, sewering, excavating and back filling and constructing a road without consideration of the type, texture and condition of the soil, rock and strata of the land, without consideration of the geological contour and formation of the land surface and its underlying strata and otherwise contrary to safe and proper engineering practices, and without making proper provisions for the runoff and drainage of surface, subsurface and percolating waters", but that the evidence produced at the trial showed that the immediate cause of the landslide was the breaking during the construction work of a four-inch pipe which allowed water to accumulate in a pool. The two appealing defendants contended that the plaintiff had alleged one cause of action but had proved another, thus defeating her claim.

The Supreme Court ruled in favor of the homeowner saying that the breaking of the pipe was merely an incident in the general situation which caused the landslide and that the defendants' failure to provide proper drainage had been adequately established. (Smith v County of Allegheny, 155 A.2d 615.)



From the Ballard-Rice yard, a tractor with extendable trailer is ready to leave for a job site with a load of three 60-foot prestressed double-T sections. (Right): The firm's P&H Model, 555C-TC truck crane seen on one of its spare-time rental assignments.

Rent, or Purchase? Cranes Helped Concrete Firm Grow

What does a company do when it has enough work for an added major machine most of the time, but not quite enough to really justify the outlay? Does it become an owner or a renter?

The Ballard-Rice Prestressed Corporation, Greenville, South Carolina, has answered the question for a crane by first renting, then purchasing a crane, then buying two more cranes and turning part-time "renter-outer." The firm is a producer of prestressed concrete beams, columns and other structurals, and it also erects much of its own production.

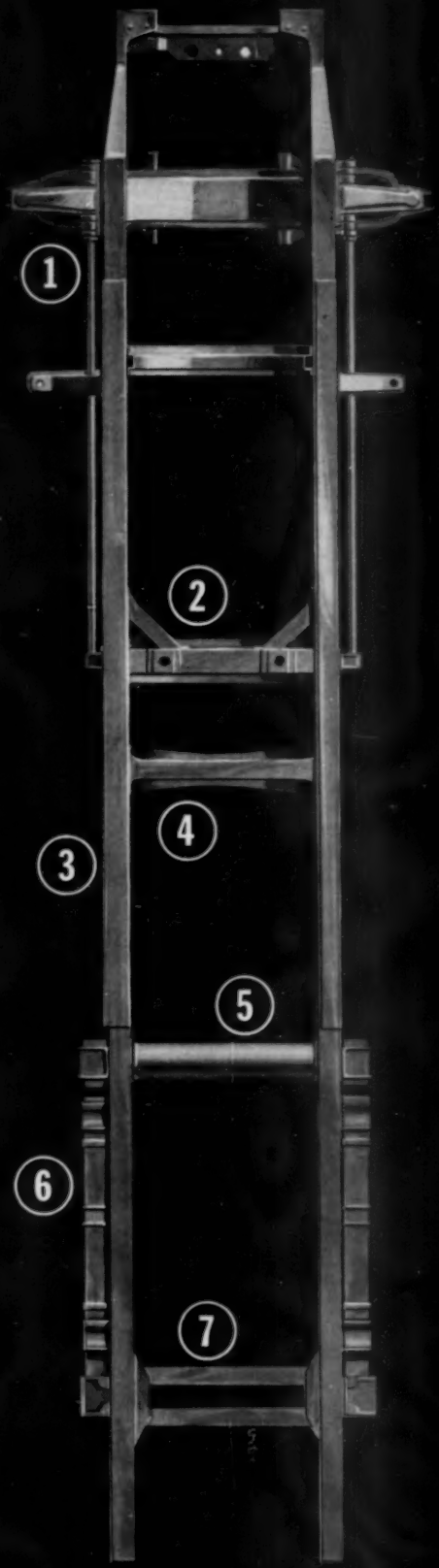
In the early days, this company rented crawler and rubber-mounted cranes from others for its work because two factors prevented purchase: (1) large job required a 30-ton capacity or large crane, yet were too few to justify the purchase; and (2) investing in a smaller crane would leave the company equipped only for smaller jobs.

This situation with Ballard-Rice did not last long. Through aggressive management in an expanding market, the company's three-member team (Haywood Ballard, Tower Rice and Alex Moss) doubled their volume in each of the last three years. As the business progressed, the firm improved its casting yard, added to its product line, and upped production.

Late in 1959 the company was ready to bring its own truck crane. It purchased a P&H Model 555C-TC equipped with 100-ft. main boom and 30-ft. jib. With this crane Ballard-Rice expanded to a prestressing erecting crane rental operation, each service complementing the other. The company recently supplied and set 36,000 ft. of prestressed T-slabs for a building job, using this crane. Then, on rental, it handled erection work for a large dam in the area (Hartwell), helped dismantle a building derrick, and performed other lucrative rental assignments.

In February, 1960, the Greenville firm purchased a second P&H truck crane (a 12½-ton 105B-TC "Miti-Mite"). Then in May, a 20-ton 255B-TC joined the spread.

In each case the company had almost enough work on its own projects to justify purchase, and by planning found enough free machine time to continue with rental jobs.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HERE'S BONUS BACKBONE BRAWN—CHEVY TRUCKS SPECIALLY EQUIPPED FOR EXTRA-SEVERE DUTY!

They're built to blaze trails lesser trucks can't travel—to bull their way through brutal back country with king-sized loads—to stand up to terrain that can turn ordinary trucks into scrap iron before their time. Chevrolet's new heavy-duty off-highway chassis equipment option is good news for off-road operators everywhere. Now you can get the profit-protecting advantages of years-ahead Independent Front Suspension ride combined with the extra chassis beef your kind of work demands. The tougher your task, the more you'll appreciate the strength and durability built into this one!

■ **EXTRA BEEF FOR BRUTAL DUTY:** That beaver emblem on the sides of Chevrolet's new extra-duty-equipped medium- and heavy-duty trucks will be showing up more and more where the jobs are toughest—where getting the work done demands performance beyond the normal call of duty. These Chevies look the same on the outside, but there's a big difference down deep. More than just an add-on or build-up package, Chevrolet's new off-road equipment option combines maximum-duty suspension components with a special-built frame that's engineered for all-out ruggedness in every detail. A frame with K-braced ladder-type construction that delivers extra torsional resilience to soak up brutal beatings.

Here's what you get: ❶ Heavy-duty 4,000-lb. torsion bars up front, anchored right at the frame K-brace crossmember for sturdy support. (Anchors are truss-rod-connected under the frame for an extra margin of strength.) ❷ Massive K-brace crossmember between the torsion bar anchors, specially designed for maximum structural rigidity and fabricated of high-tensile-strength steel. ❸ Extra-heavy side rails, of full quarter-inch stock, with full-length L-plate reinforcements. ❹ Heavy-gauge alligator-jaw crossmembers in frame midsection that combine high strength with give-and-take resilience. ❺ A massive tubular crossmember, anchored in extra-heavy cast steel brackets at the rear spring front hangers. ❻ Maximum-duty 11,500-lb. rear springs of standard variable-rate design, plus the extra margin of 2,000-lb. auxiliary springs. And ❼ a massive double channel crossmember at the spring rear hangers heavily gusseted fore and aft—the finishing touch of rock-ribbed ruggedness between roughest roads and heaviest loads.

If yours is a truck-killing job, this new option is tailor-made for you. You can get it on any of four medium- and heavy-duty models to match your needs best, and you'll be surprised at how little it costs. See your Chevrolet dealer right away for full details. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Availability: Heavy-Duty Off-Road Chassis Equipment

Model	Wheelbase	Cab-to-Axle	Max. GVW	Front Suspension Capacity	Rear Axle Capacity
C6303	157″	84″	19,500 lbs.	5,000 lbs.	15,000 lbs.
C6503	175″	102″	19,500 lbs.	5,000 lbs.	15,000 lbs.
C7303	157″	84″	23,000 lbs.	7,000 lbs.	16,000 lbs.
C7503	175″	102″	23,000 lbs.	7,000 lbs.	16,000 lbs.

1961 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

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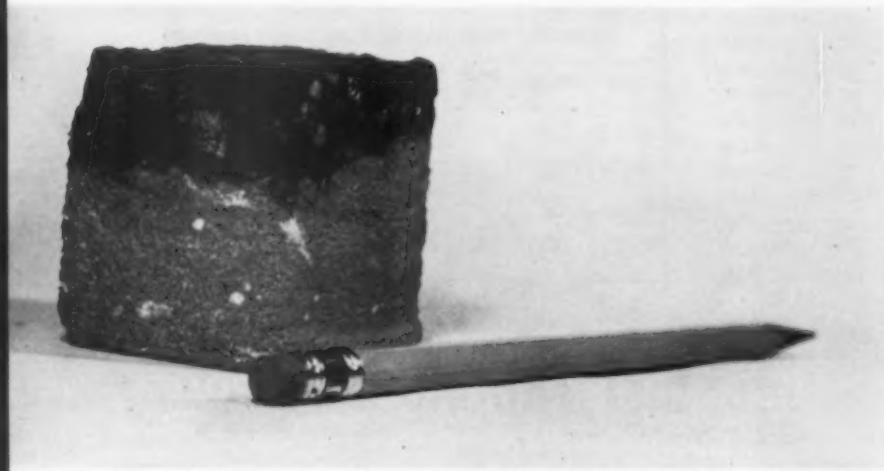
Placing hydrated lime done by controlled tailgating from the lime company's trucks.

Completed trailer parking area—paved at low cost by the stabilization method which provided base strength utilizing site materials.

Truck-Train Terminal Area Stabilized With Lime-Flyash

By William F. Hallstead



Base and surface course. Dug-out sample shows good distribution of ingredients and dense compaction.

Mixed-in-place lime-flyash stabilization lent itself recently to a pair of paving jobs in Baltimore: a 5,500 square yard ore storage pad and an 11,600 square yard 'Truc-Train' Terminal for the Pennsylvania Railroad.

As far as speed is concerned, the ore storage pad job would be a tough one to beat. The contractor—Drummund & Company, Baltimore—arrived on the ungraded site on a Tuesday afternoon. By Saturday of that week the paving was completed, and shortly the pad held its first stockpile of Venezuelan manganese ore.

The TrucTrain Terminal at the foot of Balitmore's Lombard Street was a more extensive operation. The facility consists of a 1400' x 20' access roadway, 400 ft. long parking and train loading area; and a 150' x 300' area for parking up to 60 trailers. The terminal was built to facilitate the loading of truck trailers on special TrucTrain flat cars. (The railroad has just completed a $300,000 alteration job to adapt Baltimore's tunnels and tracks for through piggyback trains.)

A patented combination of fly ash, hydrated lime and soil was mixed in place for this job and

Pulvi-Mixer blending the fly ash, lime and moisture in conjunction with sprinkler passes, made under close inspection control.

compacted at optimum moisture content to form a base course.

Tests of the site material resulted in the mixture specification tabulated.

Eight-inch thickness was specified where less than 3 to 4 in. depth of existing cinders would remain under finished base; 6 in. depth where cinders extended deeper.

The contractor graded the area with two DW10s, a D8 and two Cat 12 motor graders. Fills were compacted with a double sheepsfoot roller.

For the paving the firm used the grader, a Pulvi-Mixer, a Cat D_4 tractor with a double-drum sheepsfoot roller, a Bros self-propelled rubber-tired roller, sprinkler and other trucks. The lime was spread with a standard farm type spreader truck.

Excavation to the total base depth was not necessary, as in-place material was to be used in the mix. Following the shaping of the subgrade, aggregate was spread as called for in the roadway and truck parking area mixes. Lime and fly ash were uniformly and the mixer used to process the material to full base depth. After each mixing pass the moisture content was checked and water added as necessary. Compaction was permitted when moisture was within one percent optimum. A licensee engineer remained on the site throughout the work to run continuous moisture and density tests.

The roadway and both parking areas were topped with 4 in. of standard bituminous pavement: a 3 in. binder course of bank run bituminous concerte and 1 in. surface course, placed with a Barber-Greene finisher and compacted with a Galion tandem roller.

The entire job was completed within 20 days while the facility was in use, and at a cost competitive with conventional paving methods. Economy was effected primarily through utilization of on-site materials and through maximum excavation of the pavement subbase. A durable result is indicated by tests for this type of stabilization based on compressive strength developed through cycles of wetting and drying and/or the presence of moisture at elevated temperatures.

A feature claimed for the lime and fly ash base is autogenous healing. That is, if it should crack, the fracture will heal itself when sufficient moisture acts upon it providing that excessive movement of the base does not prevent such action.

Base Mixture Specications for Terminal

	Roadway	Parking Areas No. 1	No. 2
Lime	5%	5%	5%
Fly Ash	10%	10%	10%
Existing cinders	60%	45%	50%
Aggregate (bank run gravel with PI less than 3)	30%	45%	—
Existing soil	—	—	40%
Moisture	11%	12%	9%
Density	108 pcf	110 pcf	116 pcf
Thickness		8"	6"

"How and where can we get qualified equipment operators?" This universal call from contractors is being answered by students such as those, part of a training class at the proving grounds of the Heavy Equipment Division of Northwest Schools in Chicago.

Call For Better Earthmoving Operators

By Charles W. Hillman
Placement Director, Heavy Equipment Division, Northwest Schools

An operator of construction and road equipment today needs to know the new high-speed equipment and its maintenance. If he hopes to advance in the contractor's organization, he needs a special educational background. This should include training in the principles of grading and excavating, surveying, the basic characteristics of rock and soil, practical mathematics, and at least a smattering of civil engineering. Also the ability to read blueprints, understand the problems of the contractor.

Contractors can't always afford to train new men on the job. Time and money lost in this effort might spell the difference between profit and loss.

One answer is in the promising field of formal heavy equipment education. By this I mean the trade schools that today offer the student —youngsters as well as the older fellows who are seeking more knowledge in order to do their jobs better —a formal training in the principles of modern earthmoving equipment.

The best of these schools offers the student a comprehensive home study course in fundamental engineering and operation of modern equipment and modern techniques. These courses are surprisingly thorough, and not a little engineering skill and mathematics are required of the student to graduate. Also included in the courses are periods of actual instruction and field practice using the equipment that the students will eventually operate on the job.

Here at Northwest Schools we have trained and placed hundreds of these students, many of whom had never previously sat on a tractor. These graduates have been assimilated by employer-contractors with minimum orientation.

Since we provide student counselling and placement service after graduation, it is my good fortune to be able to follow the careers of these men after graduation. It is especially gratifying that most continue their education after landing a job. Many write for information on latest developments, and while on the job refer back to their textbooks as problems arise.

We have had applications from men as old as 65. However, we try to limit the age to 50 which, experience has shown, is about the maximum for a trainee in this business. We also have been getting an increasing number of trainees sent to us by contractors themselves with the approval of the unions involved. Graduation does not guarantee acceptance into the various unions. of course, but an outstanding candidate has had little difficulty on this score.

Film Shows Methods for Cement-Treated Subbases

Various methods used to construct cement-treated subbases are shown in a new sound and color motion picture, "Cement-Treated Subbase for Concrete Pavement," produced by the Portland Cement Association.

The 11-minute 16 mm film describes "between-the-forms" construction, as practiced in California, as well as several variations of the more common "mixed-in-place" method of cement-treated subbase construction. The central plant mixed method is also described. The film is available on loan in the U.S. and Canada from the Association at 33 West Grand Avenue, Chicago 10, Ill., or through any of PCA's 35 district offices.

Pennsylvania Pike Acts on Barriers

After awarding a $1,322,000 contract to Whitmyer Bros., Inc., of Hammonton, N.J., for the installation of 91 miles of medial barrier on the Pennsylvania Turnpike, the New Jersey Turnpike Authority pledged to complete medial rails the entire length of the cross-state toll road as "rapidly as can be orderly planned and financed."

Guard rail installation, scheduled for completion by June 30, 1961, was due to proceed at the rate of about two miles a day. The rail will conform with the existing 47 miles of railing, set 25 in. high above pavement level, near the middle of the 10-ft. separation. Corrugated, galvanized universal railings are to be used. Railing will cost about $14,500 a mile.

The commission also has acted on traffic improvement plans for the western portion of the pike. It named Michael Baker Jr., Inc., Rochester, Pa., as design engineer for a new parallel second tunnel at Allegheny Mountain. The firm also is general consulting engineer for the turnpike commission and recently recommended that the new tunnel be constructed to ease traffic.

The commission also selected the engineering firm of Swindell-Dressler of Pittsburgh to design a bypass to skirt the Laurel Hill section of the toll road near Somerset. Plans call for abandonment of the Laurel Hill tunnel upon completion of the bypass.

Commission chairman Joseph J. Lawler said all three projects were aimed at improving highway safety. Designs for both the tunnel and the bypass are expected to take at least a year, with construction requiring about two more years.

A commission planning board is proposed to survey long-range problems as a means of preventing costly "pitfalls and errors" in the turnpike's improvement and operation, which might result from hasty decisions made during emergencies. Problems which "may later become emergencies" and should be studied now by a planning unit include the following: Rates of speed for various classifications of vehicles; traffic and safety barriers; road patrolling; and sufficient and regulated parking areas to be used by tired drivers, as well as by picknickers.

Other pike problems seen ahead include: Additional tunnels or bypasses; extra climbing lanes on grades, new interchanges and improved present facilities; service areas and the need for additional locations; and present and future financing.

Michigan Out Front in Freeway Construction

The Michigan state highway department claims a leading position in the program to open up new freeways. Over 122 miles of new freeways were planned for opening to traffic during the last two months of 1960. During this period the state passed the 500 mark in freeways in service, which is five times the length of freeways that were in use only three years ago.

The state also claims the distinction of having the longest continuous stretch of toll-free Interstate highway in the nation—203 miles from Detroit to Stevensville, near St. Joseph.

JOSLYN SELLS IT...

Have you ever had the pleasure of telling a TRUE story that sounds like a gross exaggeration? This is the Williams Digger story!

Some earth boring machines are designed for large diameter drilling, others are built especially for greater depth capacity. Underreaming is a problem that one digger is supposed to solve, while another aims for high production drilling.

But to describe a Williams digger, we have to make all of the claims mentioned above and then add a few Williams exclusives to tell the whole truth.

JOSLYN sells the first one to a contractor, and after that . . . The Williams Digger sells itself!

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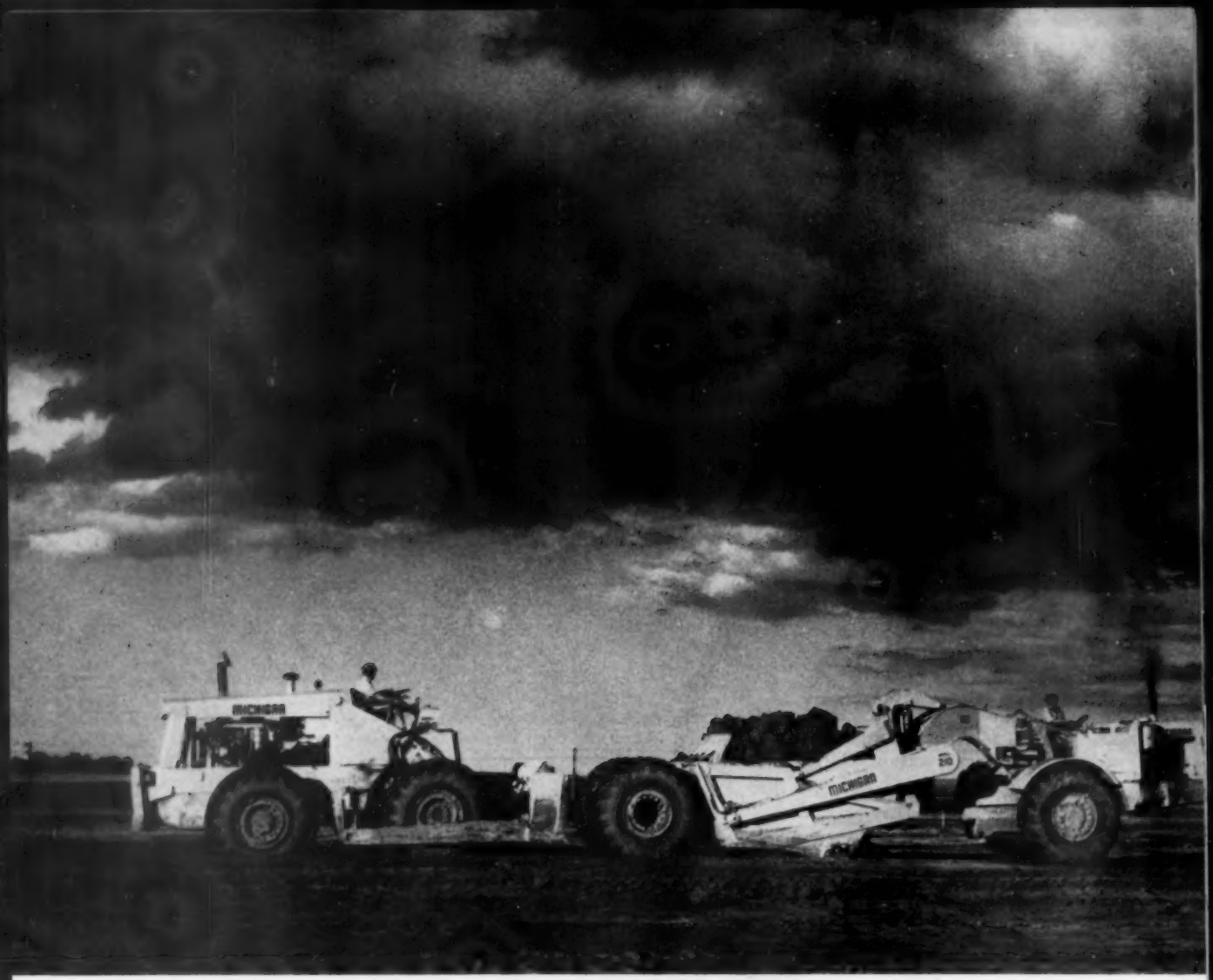


Speed was the answer to lost time caused by rain. Pushing in both directions at 4 mph . . .

Michigan Dozer loads

The forecast was for rain . . . and more rain. Same forecast yesterday . . . and the day before . . . and the week before. Already, Anderson Earth Construction Co, Calgary, Alberta, had lost 25 shifts. Even worse, only 40 shifts or so were left before freezeup. The job—500,000 yds of borrow, plus 40,000 yds of common excavation on a 3.14 mile stretch of new Highway #2 south of Calgary—*just had to be completed!*

Fleet includes two Michigan Scrapers

Even under this pressure, William Anderson, owner-manager of the firm, had a team he felt confident of—two 19 yd Michigan Tractor Scrapers, two 18 yd units and a rubber-tired 262 hp Michigan Tractor Dozer. Speed was the factor, felt Mr. Anderson, which could get the job done. "Basically," he says, "our confidence was founded on a loading method made possible by the Tractor Dozer."

This Michigan, *like all Michigans*, had the same gears, and speeds, both forward and reverse. Equipped with a pusher-block in the rear, it could push either direction with the full power of its 262 hp engine equipped with torque converter. Thus, by loading scrapers in alternate directions, all turns and all backup time would be saved.

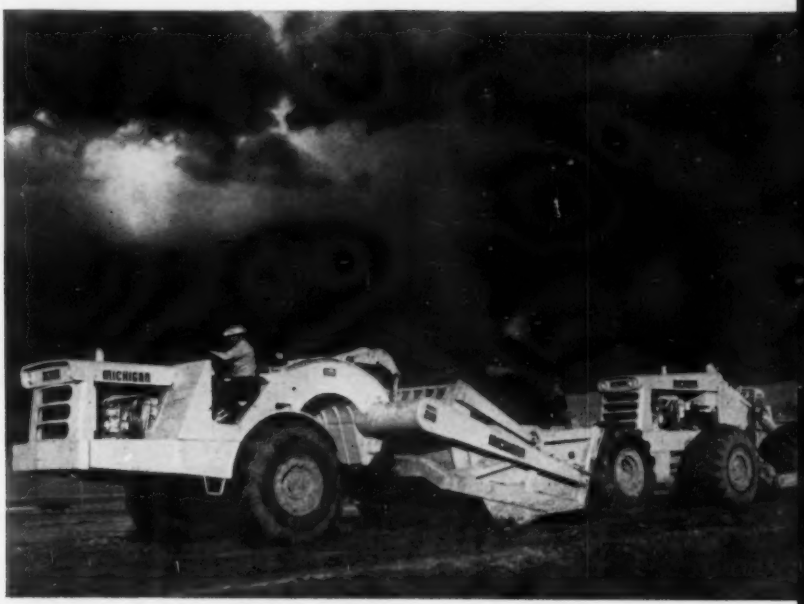
Average load time —35 seconds

And so the final phases of the wet job proceeded. Load times in the water-soaked clay ranged from 25 to 45 seconds. Most pushes were made in second gear, averaging 4 mph. Loads averaged 14 to 15 pay yds. Even in this slippery footing, the Tractor Dozer with 29.5-25 hydroflated tires, four wheel drive, and a working weight of 56,680 lbs, had plenty of traction.

Dozer services 4 scrapers despite hauls under 1000 ft

Cross-sections showed it loaded 832

Michigan Dozer, pushing in reverse, heap-loads 19 yd Michigan Scraper with heavy, moist clay in just 35 seconds.



Push-blocks, front and rear, save backup and turning. In either direction, Model 280 Dozer heaps scrapers at about 4 mph.

832 pay yds per hour

pay yards per hour. This average was maintained hour after hour despite working conditions that were really rough on the operator. A standard 12-hour shift, for example. Four scrapers to push-load, one more than usual, even though most hauls were under 1,000 ft one-way. The loading pattern of alternating directions of push which while it cut waiting also gave the Dozer operator virtually no time to rest. Yet, because of its ease of operation, the Michigan Dozer and its one operator produced as much in their 12th hour of work as their first—an average of 10,000 pay yds per day.

Strips overburden, too

Michigan speed had another advantage. With a top speed nearly equal to the scrapers, the dozer traveled from one of the job's eight borrow pits to the next in a matter of minutes. Generally, it would go in ahead of the scrapers and quickly strip two to three feet of overburden before loading began.

"I'm convinced," says Mr. Anderson, "that these rubber-tired tractors will move a lot of prairie dirt in the future. They've sure got the speed."

Perhaps *you*, too, would like to be convinced of Michigan Tractor Dozer power and capacity on *your* job. There are four models to choose from—162 to *600* hp. Also, check the matched Michigan Tractor Scrapers—same basic power train design, same engines, same controls, 10½ to 29 yd capacities. Select the sizes you want to see, then call your Michigan Distributor for a no-obligation demonstration.

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Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY

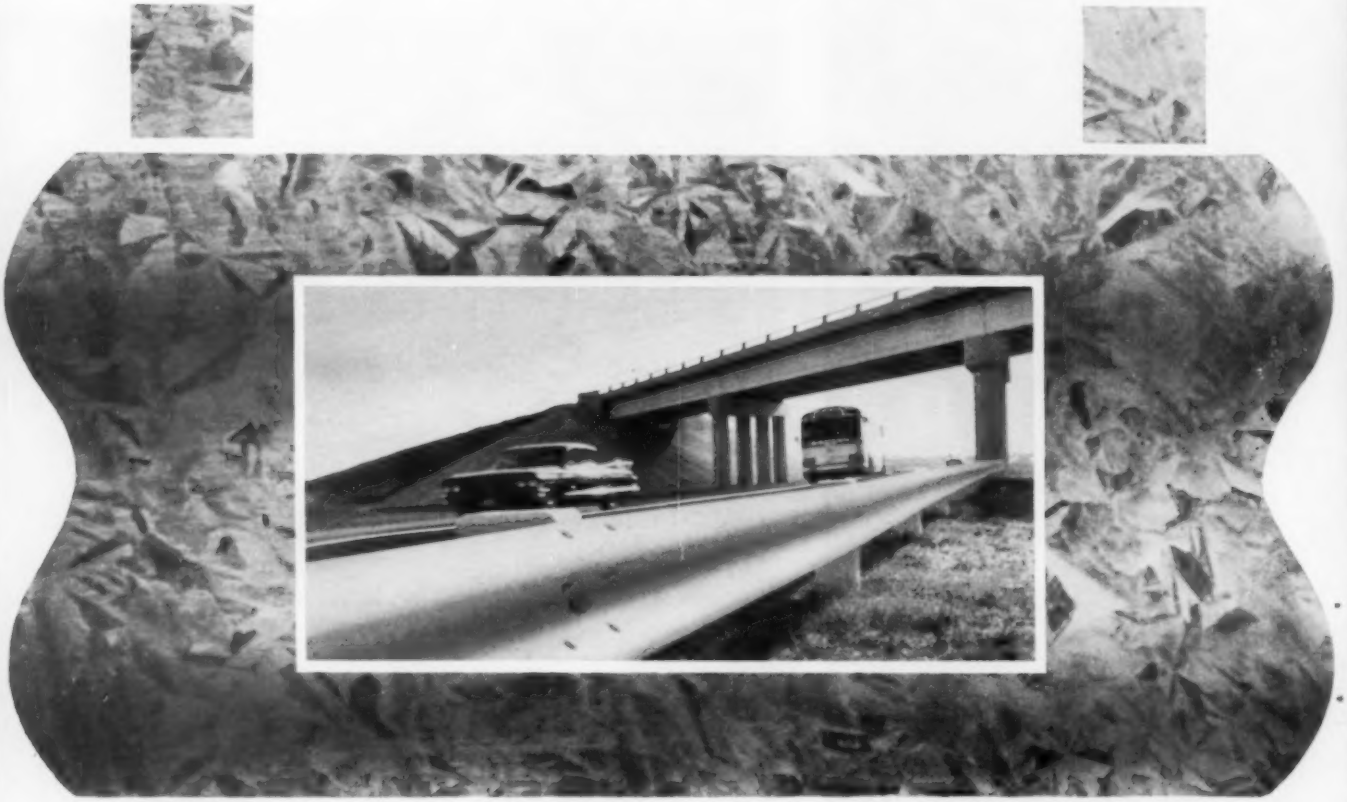
Construction Machinery Division

2497 Pipestone Road
Benton Harbor 34, Michigan

CLARK® EQUIPMENT

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

Stand-up-ability—strong reason why more and more roads are . . .



GUARDED BY GALVANIZED STEEL

Guard rails of galvanized steel are gaining favor . . . fast! Big reason: stand-up-ability . . . a neat knack of holding the line not only against impact, but also against the more gradual gnawing away that is done by time and the elements. From their inner steel core to their outer zinc coat, galvanized guard rails and median barriers stand up long and strong to deliver topmost protection with minimum cost and upkeep.

WEIRKOTE® IN PARTICULAR—You gain when you specify long-life galvanized steel for your guard rails. And you gain even more when you specify National Steel's Weirkote. To the inherent strength of steel, Weirkote adds *enduring* zinc protection. Weirkote is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. For complete details, write Weirton Steel Company, Weirton, West Virginia.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
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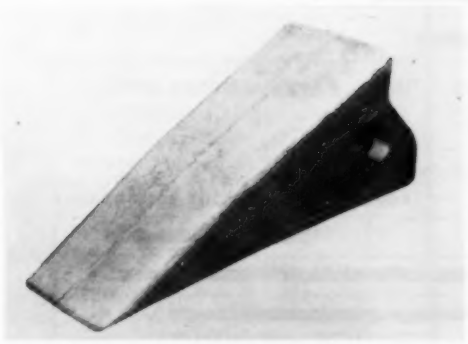
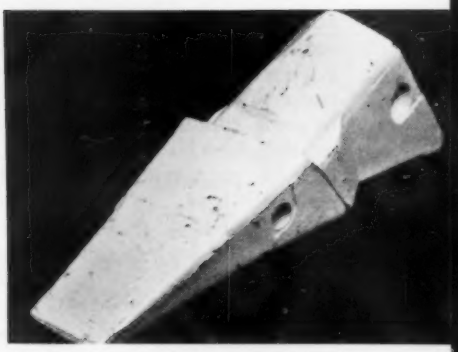


Tip A—High Strength tip, for use in extreme hardness conditions.

Tip B—Tapered point design. Gives best results where fracturing and penetrating qualities are necessary.



Tip C—Tip and boot combination, for use in extremely abrasive conditions.

Ripping Results Depend on the Right Teeth

Greater profit accrues to the tractor owner who makes a proper selection of ripper tips for his machine. What are the various conditions that dictate the type of tip to use? Here are some of the fundamentals for guidance:

The secret to ripping action is the tremendous force applied to the tip of the tooth by a 40-ton machine, twice that if a second tractor is used to push behind the tooth (tandem ripping). Because tip replacement is frequent on most jobs, it is important to recognize the differences in ripping conditions and choose the best tip for each job.

Following are three typical jobs where different ripping conditions required careful tip selection for maximum economy.

Case A

A limestone quarry in a congested Midwest city replaced its costly and damaging blasting operation with ripping. The rock was extremely hard. Sometimes tandem ripping was necessary. Under these conditions strength was the most important factor in choosing the most economical tip. A high-strength forging of large proportions (4-in. point) was recommended. The extreme hardness encountered caused the tip to blunt after only 15 percent wear, and it was replaced to maintain good penetration. But great strength made this the best tip to use.

Case B

A layer of sandstone overburden was being removed from a coal seam in Pennsylvania. Big tractors ripped and bulldozed the material faster and more efficiently than blasting and loading with draglines. In this case the ripping was not extremely difficult, so a narrower tip was used for better penetration and fracturing. This tip is tapered to a 2½-in. point and is undercut for self-sharpening. Because of this feature the tip may be used until it has worn the entire point down to the shank cavity—30 percent of the metal in the tip.

Case C

On a highway job in the Southwest, the contractor hit a section of decomposed sandstone. He had to break it up so that the wheel tractor-scraper units could load and haul it away. Ripping this material was comparatively easy and was the obvious way to do the job. Fracturing was no problem but extreme abrasion caused a high wear rate on the tips. It was here that the tip and boot combination gave the most economical performance. The strength of a one-piece tip was not needed and the small, inexpensive tip was replaced often without disturbing the boot. This tip tapers sharply from about 6 in. to 3 in., and can be half worn away before replacement.

Chart I shows a sumary of tips A, B and C as used in different materials. There is some overlap between tip applications; however, field tests show that the design of tip B makes it an excellent general-purpose choice in a broad range of applications.

Although these three examples do not cover every ripping situation, they illustrate the wide range of general tip usage. Nor do they include every type of tip on the market today. In addition to variations on the above, there are tips combined with a mounted wedge or a wing dragged behind. This loosens a wider swath of material and in some conditions breaks it into smaller pieces. These tips will often increase production but in some material, especially more difficult ripping, production could be *decreased* if the tip is not adequate for the job.

If maximum production in medium-to-hard ripping is to be maintained, the importance of the *ripping angle* cannot be overlooked. This angle is the one formed between the top side of the tip and ground level. But again, variations in conditions prevent any one, single conclusion. Different materials, even the same type at different stages of decomposition, do not have similar optimum ripping angles. Test results show the most efficient ripping is done in a range between 40 and 50 degree angles.

These angles are determined by the clevis, or tooth mounting. There are two major types of clevis. The parallelogram mounting keeps the tooth at one angle, no matter what the depth of penetration. With the multi-position clevis, the angle varies with the tooth depth, thereby allowing a change of setting on the clevis to get the optimum angle for a certain material and depth.

As material increases in hardness, the depth of penetration becomes shallower but the ripping angle should always remain between 40 and 50 degrees. Chart II summarizes the settings of a 5-position clevis, according to material hardness.

Big-tractor ripping is no longer in its infancy. It has already proved time after time to be a safer, more economical method of fracturing layers of natural rock. With its success has come more scientific analysis of the relationship between machine and material. Seismic analysis, for example, makes it easy to determine valuable information on rippability.

Careful study of each set of conditions—material hardness and abrasion, required depth of penetration—will help determine machine size, tip selection and clevis position. Such conclusions are important to an efficient and profitable ripping operation.

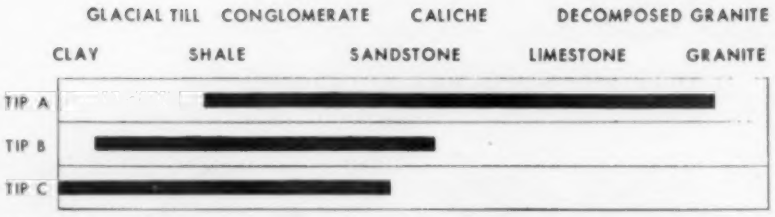


Chart I—A guide to the type of tip to use in different hardness materials.

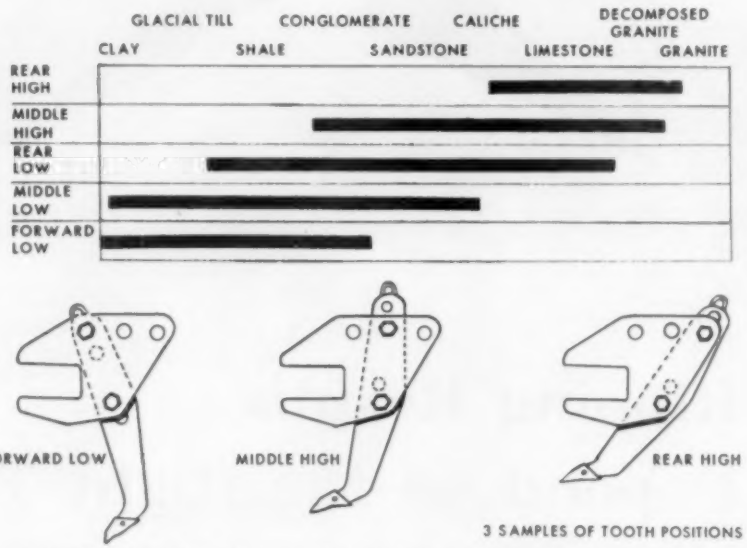


Chart II—Choice of five recommended angles for the ripper tooth, depending on the type and hardness of the material to be ripped.

Editor's Note: These recommendations are supplied by Caterpillar Tractor Co., Market Division, Sales Development Department. The reader is also referred to articles on ripping in the following Roads and Streets issues: "Ripping—Beyond Ripping," May, 1958; "Rescue by Ripping," February, 1960.

New Jersey Plants Shrubs as Median Barrier

Thousands of shrubs have been planted by the New Jersey state highway department in the center island of Route 202 between Flemington and Somerville. The purpose: to cut headlight glare and prevent cars from illegally crossing the median. A total of 16,525 lin. ft. of the highway was planted by contract at a cost of $16,089. Over 6,500 shrubs were set in two lines 5 ft. apart in the 32-ft. wide grassed island.

Most of the shrubbery barriers are spotted along the crests of hills to reduce headlight glare, while not completely screening the opposing roadway. Other plantings were spotted to prevent motorists from taking illegal short cuts across the median, instead of using safe jughandle left turn facilities.

The expectation is that in a few years, the shrubs will grow together to form a resilient, self-repairing barricade that will cushion impact as well as block vehicles from plowing through to the opposing roadway. The shrubs which are Privet, Japanese rose bushes and Viburnum plants will be maintained about 4 ft. high.

Meetings

SOUTHERN SAFETY CONFERENCE AND EXPOSITION—Southern Safety Conference, Inc., Biltmore Hotel, Atlanta, Ga.; March 5-7.

AMERICAN ROAD BUILDERS ASSOCIATION—59th Annual Convention, Chalfonte-Haddon Hall, Atlantic City, N.J., March 5-8.

AMERICAN SOCIETY OF CIVIL ENGINEERS—Spring Convention, Hotel Westward Ho, Phoenix, Arizona; April 10-14.

AMERICAN WELDING SOCIETY—42nd Annual Convention and Welding Exposition. Sheraton-Atlantic Hotel, New York, N.Y.; April 10-15.

WISCONSIN ROAD BUILDERS ASSOCIATION—Annual Meeting and Convention, Schroeder Hotel, Milwaukee, Wis.; March 13-15.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES—37th Annual Meeting, Traymore Hotel, Atlantic City, N. J.; March 22-24.

MICHIGAN ROAD BUILDERS ASSOCIATION, INC.—Annual Meeting, Lansing Civic Center, Lansing, Mich. March 28.

WESTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS—40th Annual Conference, Flamingo Hotel, Las Vegas, Nevada; April 23-28.

CONFERENCE ON PARKING—Georgia Institute of Technology, School of Civil Engineering, Atlanta, Ga.; May 18-19.

California Bill Would Permit Consultants

Consulting engineers or architects could be used to supplement state employees in the California department of public works programs, under a bill recently introduced into the legislature. At present all design and project supervision for highway and building projects are handled by state employees.

A CONTRACT FOR 800 TWO-WAY mobile radio units from the state of California has been won in competitive bidding by Motorola. About 550 units will be installed in vehicles of the State Highway Patrol, and 200 radios used by the Division of Highways.

Powder-lance seen burning through 18 in. reinforced concrete wall.

Powder-Lance Cuts Thick Concrete with Saving

A process called powder-lancing helped to complete an unusual concrete cutting job at Hill Air Force Base near Ogden, Utah. Reinforced concrete walls 18-in. thick were sliced through in record time. The process developed by Linde Company, Division of Union Carbide Corporation, was used to cut doorways in the concrete walls of an engine test building, being converted for other use.

Powder-lancing utilizes a special mixture of iron and aluminum powder known as Oxweld No. 201 Lancing Powder. The mixture is fed pneumatically through lengths of black iron pipe fitted into a lance handle and mixed with oxygen. The lance, manually operated, consists of a handle with one or more lengths of consumable black iron pipe attached. The powder and oxygen are mixed in the pipe ahead of the handle, carried to the cut by the pipe, and ignited to produce an intensely hot reaction which melts the concrete. Cuts in concrete up to 12 ft. thick have been made by this method, and theoretically there is no limit to the thickness that can be cut.

On the Hill AFB project, a single operator with a powder-lance was able to cut a 10 by 10 ft. opening in an 18-in. thick wall in one 8-hour day. In sharp contrast, jackhammer crews required ten days to cut out an identical doorway. The powder-lancing operation consumed 3660 cu. ft. of oxygen per hour, 293 cu. ft. of nitrogen per hour for the pneumatic powder dispenser, and 100 lb. of iron-aluminum powder per hour. One-half inch black iron pipe, used in 18-ft. lengths, was expended at the rate of 1 ft. per 1 in. progress in the concrete cutting.

The cost of powder-lancing each 100 sq. ft. opening was estimated at $352, or about 30 percent less than with conventional techniques.

Better service accessibility alone makes the "Euc" C-6 your best tractor buy

In the Euclid C-6 crawler you get the advantages of job proved components and years-ahead engineering that keeps down-time and operating cost to the absolute minimum. You get unitized assembly of major components and service accessibility that is unsurpassed by any crawler . . . replacement labor costs are well below those for comparable tractors. For example, complete removal and replacement of a C-6 radiator takes less than one third of the time required for the same work on a competitive machine.

With easy accessibility for servicing and maintenance, the C-6 gives more work-time on the job . . . steps up production . . . helps beat the profit squeeze by cutting operating costs to a new low.

EUCLID Division of General Motors
Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Full-power shift . . . this Euclid C-6 crawler responds like nothing you've ever touched!

Get all the facts and figures on the C-6 . . . you'll find low operating cost plus proven reliable performance make it your best tractor investment.

"Euc" C-6 gives you the advantage of easier servicing ***plus*** *these top performance features:*

PROVEN POWER
PROVEN TORQMATIC DRIVE
FULL POWER SHIFT
COMMON STEERING-BRAKING
FAST-AS-A-FOX RESPONSE
EXCEPTIONAL MANEUVERABILITY

Brief specifications . . . 211 net h.p. delivered to power train . . . torque converter and semi-automatic transmission . . . independently suspended final drives . . . oil cooled multiple disc brakes . . . dry type air cleaner . . . 7 track rollers on each side . . . rear-mounted radiator.

A NEW DESIGN CONCEPT THAT SETS NEW STANDARDS FOR PERFORMANCE AND LOW OPERATING COST IN THE 200 H.P. TRACTOR CLASS

GM GENERAL MOTORS EUCLID

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FOR MOVING EARTH, ROCK, COAL AND ORE

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AED

Continued from page 49

the goal of a proper return for services rendered. "We should practice the principles of sound business, and we should cooperate in helping our contractor friends recognize they are dealing with businessmen—and that it's to their advantage to transact business on the basis of mutual respect. Transactions should allow for proper margins of profit, realistic terms that carry suitable protection to the seller, and be backed by sufficient financial stability to assure the seller that commitments will be taken care of on prescribed dates."

"However, we distributors must also correct other practices that are controllable solely by us as businessmen. We are going to have to adapt our operations to the fundamental market changes that loom so certain in the future. This is the real challenge we face and which we must accept to insure future profits."

This speaker asked fellow-dealers to stop accumulating both new and used inventory that c a n n o t be moved within a reasonable time at a proper profit. This means selective equipment purchases, and taking in used equipment only at realistic values. "We have been our own worst enemies in this respect."

Cautiousness in extending credit will reduce repossessions, which can be a source of financial embarrassment and also add to inventory woes, said Mayer in coming back to this subject. "In the handling of warranties, the selling price of equipment should allow for its proper servicing while under warranty. But, let's not confuse preventive maintenance with warranty service. Here again the customer should understand just what he is entitled to, and not expect the distributor to perform his equipment maintenance under the guise of warranty service."

"Leasing of heavy equipment is another element that can get us into serious trouble if not properly understood and handled," said Mayer. Leases can cover use of the equipment only or include maintenance and repair of the leased property. "Further growth of leasing is forecast for our industry because the theory of paying for the use of equipment, rather than owning equipment assets, seems to be increasing in heavy construction. This seems to be true where work is done on a bid basis and each job is a separate entity."

In effect, said the retiring AED president, in conclusion, some contractors are willing to pay high charges for the privilege of obtaining equipment without the normal down payment—to pay high charges for the use of only part of the equipment's total value—or both. Distributors in this type of business must establish charges adequate to cover proper amortization of the equipment plus a reasonable profit. The charges must also cover maintenance and repair, if included as part of the lease arrangements.

Following president Mayer's talk at the opening session, P. E. McAllister, of Indianapolis, moderated a panel discussion on "A Second Look at the Soaring 1960s." Spokesman for equipment manufacturers was M. R. Yontz, president, LeTourneau-Westinghouse C o m p a n y, Peoria. Yontz said that most of the industry's factories operated at only 50 to 60 percent of capacity in 1959, but that despite the poor year, research continued on a wide front.

"Research and development have become more important in every manufacturer's o p e r a t i o n s," he said. "This emphasis is spurred by the keen competition, and by the contractor's search for every possible cost reduction." Yontz went on to tell of the growing time lag and cost of today's very expensive product development work, which often takes five to seven years until a new machine is on a profitable basis with the manufacturer.

This research promises to set a record for expenditure in 1961, said this speaker, and this despite lower profit margins. Many new products can be expected to come out soon, as a result.

Yontz spoke of "built-in obsoles-

cence," a phrase common in the automobile business with its forced annual model changes. In contrast, equipment obsolescence that has occured in the construction field has come about through natural evolution of design. Yontz in effect spoke to the country's contractors as well as his immediate audience of distributors by saying that a smaller portion of the contract dollar is being spent today for construction equipment than in the past. This is due to better equipment quality, and a lowered obsolescence factor. This would seem to work against manufacturers and distributors, Yontz continued, yet 1960 sales of construction machinery were 90 percent higher than for 1938, after adjustment of the dollar's value, showing how mechanical research has borne fruit in increased mechanization.

The finance agency's viewpoint in this panel discussion came from R. S. Murphy, vice president, CIT Corporation, New York. He told delegates that finance companies should have ample money during 1961, and that charges for money and services should not change appreciably. He said that a mixture of long-term and short-term money will enable finance companies to meet most of their client's varying needs.

Other sessions at the AED convention were devoted to distributor company management, manufacturer-distributor relationship, inventory control, used equipment, and other business problems. The highway program came in for special attention, with a progress report on the Better Highways Information Foundation by Erskine Stewart, the foundation's vice president, and a word in behalf of the distributor's customers by AGC's president-elect, M. Clare Miller, of San Ore Construction Co., Kansas.

Contractors and Equipment People in Same Boat

(Editorial)

Contractors have good reason to read the remarks, excerpted on this page, made by H. J. Mayer in his presidential address at the Associated Equipment Distributor convention at Los Angeles. For, by and large, no segment of an industry can continue to make good profits when other segments do not.

Mayer here reviews practices such as overly-liberal or "shoe string" credit and excessive price discounts of manufacturer and dealers, that have headed many distributor firms toward real trouble. And all at a time when jobs have been at high level.

It doesn't help much to trace back and realize that a cycle of factory over-expansion, contractor over-equipping and business over-optimism was set off when Congress voted the expanded highway program. The need now is for everyone to look at 1961 as the spring buds open up. As reported in Roads and Streets in January, highway awards boiled up to a high volume in the last weeks of 1960. Road lettings are continuing at a pace far ahead of this time a year ago, and President Kennedy's release of advance federal-funds will further sustain road awards. This should be the largest or next-largest year in history in highway work in this country.

In building these roads, and all the other heavy construction, contractors will need the backing of strongly financed and ably managed distributor organizations. Contractors often fail to realize how much they depend, from day to day, on the services their dealer friends can render: parts in a hurry, repairmen in emergency, advice in the use and care of their machines. Yes, and new machines, ready to wheel and "right" for the job. To keep up this support, distributors must make a profit, along with the contractor.

Manufacturers, too, must make money to survive, expand, spend for development of tomorrow's better machines, and help lead the construction industry into new and better methods.

But it is the dealer who is closest to the contractor, and whose business health most quickly and directly effects his customers' welfare.

Spotlighting destructive practices no doubt does some good, and Mr. Mayer has rendered the whole industry a service by his blunt and forthright talk at Los Angeles. But this is a free country, and nobody can keep his competitor from underselling him and going broke, if that's the way the fellow wants to do it. The sermon for the constructive leadership among contractors, however is clear, and that is: in the long run, all are in the same boat.

What's the answer? Roads and Streets again offers only one, and that is for everybody to know his costs better. Contractors, particularly need to bid with a far greater cost knowledge than generally prevails. And distributors as well as equipment purchasers need to know more clearly the financial consequences of shoe-string or cut-price equipment buying with the equipment repossession and other consequences that eventually hurt everyone.

New Radio Network for Metropolitan County

A new two-way radio system that allows selective calling of 55 mobile radios is being installed by Motorola in Cook County (Chicago area) for the Illinois division of highways. The $65,000 network will facilitate the department's road maintenance work and project supervision.

The equipment includes a 250-watt base station in a department building on Chicago's Northwest side, remote control dispatching facilities at the district office in Chicago's central business district, a repeater station to link these two stations, and 55 extensively transistorized radios.

The "Quik-Call" selective signaling equipment used will enable the downtown dispatcher to call any mobile unit without alerting the others. This is done through inaudible tone codes sent with the voice message.

This engine will last longer if it pulls a load than if it idles excessively. The power unit is an International U-164 diesel on a crushing plant owned by Bocek Brothers, of Aberdeen, Washington.

Pointers for Long Engine Life

Laboratory tests and field experience show that more engines are ruined by too much idling than by overloading. So reports the service department of International Harvester Company's Construction Equipment Division.

A well-designed engine should deliver its rated horsepower for thousands of hours, until normal wear of the high-mortality parts (pistons, rings, sleeves, bearings and valves) necessitates an overhaul. Symptoms which indicate an overhaul are lack of power, excessive oil consumption and rough running.

The same signs of trouble may appear in a "loafing" engine after a few hundred hours' operation. But, when the unit is disassembled, the pistons, rings, sleeves and valves will not be worn.

Instead, you'll likely find heavy concentrations of sludge in the lubrication areas. Also carbon deposits in the intake manifold, at the intake valves and on the pistons. The cylinder walls may be glazed, and poor spark plug performance can be expected on carbureted engines. Sludge and carbon deposits tell a story: the engine has not been operated at the most efficient temperature.

Light loads, also, do not generate enough firing pressure to force the piston rings against the cylinder walls. The lack of proper ring contact is the direct cause of glazed walls, lubricating oil contamination, and excessive oil consumption.

Of course light engine loads are sometimes necessary, and some idling unavoidable. It is possible, however, to prevent damage and insure normal life by observing the following points:

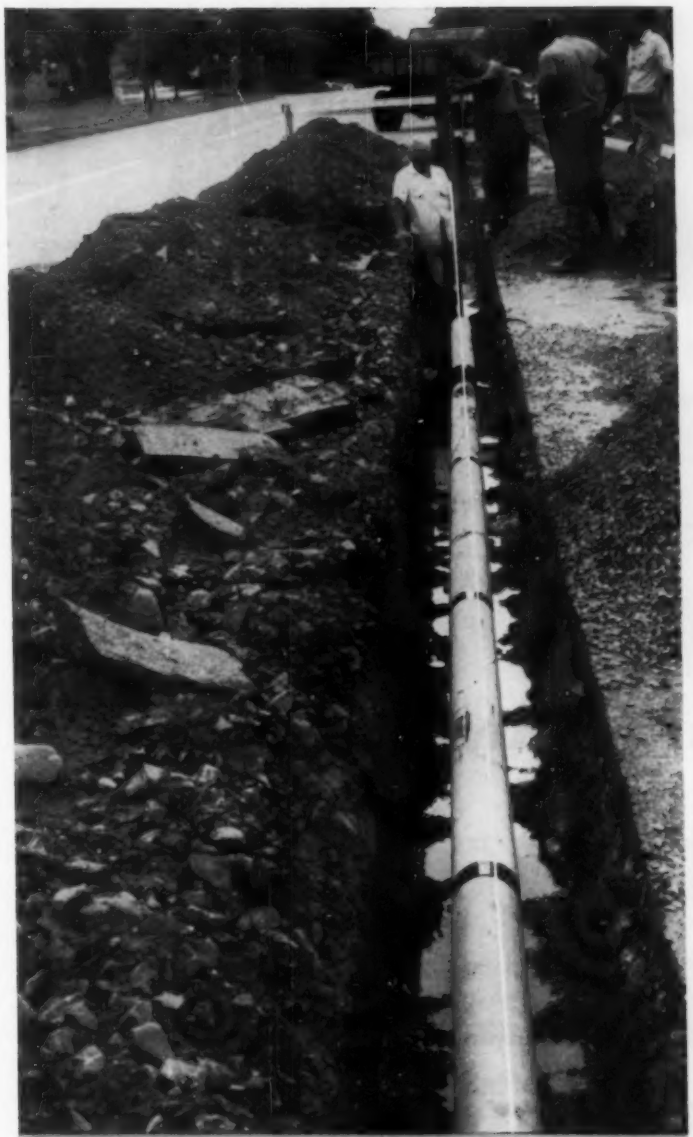
(1) Have right sized engine. Buying one too large for the job, with the thought it will give longer life, is false economy. An engine should be allowed to develop its rated horsepower and speed.

(2) Idling time should be reduced, especially during the break-in period. Most modern diesels, even the largest, start easily, and should be shut off when not working.

(3) Proper operating temperature should be maintained through use of correct thermostats corresponding to ambient temperatures and loads. The radiator core should be covered, if necessary.

(4) The correct oil should be used. Light loads with long periods of idling are considered severe conditions and require the use of heavy-duty oils. High-detergent oil and frequent changes are necessary to prevent formation of power-robbing sludge and carbon deposits.

International Harvester reminds: It is not the size of the load that counts, but how nearly it meets the specified rating of the engine. If the engine runs under normal loads, then all parts operate at ideal temperatures and clearances to give the most efficient operation and long life.



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TRANSITE UNDERDRAIN PIPE

- **Extremely good weight-strength ratio**
- **Naturally smooth interior**
- **Resists corrosion**
- **Assures low frictional resistance to flow**
- **Excellent alignment, tight joints, low material cost for new installation economies**

For highways, airports, dams, industrial plant sites—anywhere there's a subsurface drainage job to be done—Johns-Manville Transite® Underdrain Pipe does it effectively and economically.

The plastic coupling used with Transite Underdrain Pipe assures a permanently tight, *flexible* joint . . . keeps out waterborne silt and maintains permanent pipe alignment. And, because of Transite's long (10 ft. and 13 ft.) lengths, fewer joints are needed in the line.

Made of tough, durable asbestos and cement, Transite Underdrain Pipe won't rust. Its interior is made smooth to stay smooth, assisting the flow of water and reducing the opportunity for solids to find a resting place in the line. As a result, the perforations are able to perform their function of permitting entry of ground water into the line , at a maximum rate, where it can be quickly carried off.

Transite's low material cost, installation and maintenance economies mean important savings from the time it is specified until there is no longer a need for the line. Let us send you, without obligation, our book TR-246A. Write Johns-Manville, Box 14 (RS-3), New York 16, N. Y.

SECTION THRU HOLES

The minimum crushing strengths* of Transite Underdrain Pipe for subsurface drainage systems are shown in the following table:

PIPE SIZE (inches)	TOTAL APPLIED LOAD PER LINEAL FT. (pounds)	PIPE LENGTH (feet)
6	1,000	10
8	1,000	10
10	1,100	13
12	1,200	13

*A.S.T.M. 3-edge bearing method
A complete line of fittings is available including elbows, tees, wyes, crosses, end caps and increasers.

JM PRODUCT

JOHNS-MANVILLE

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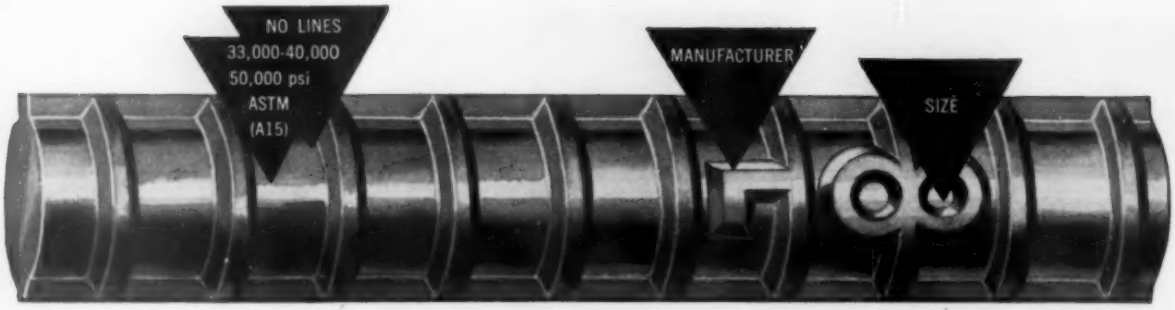

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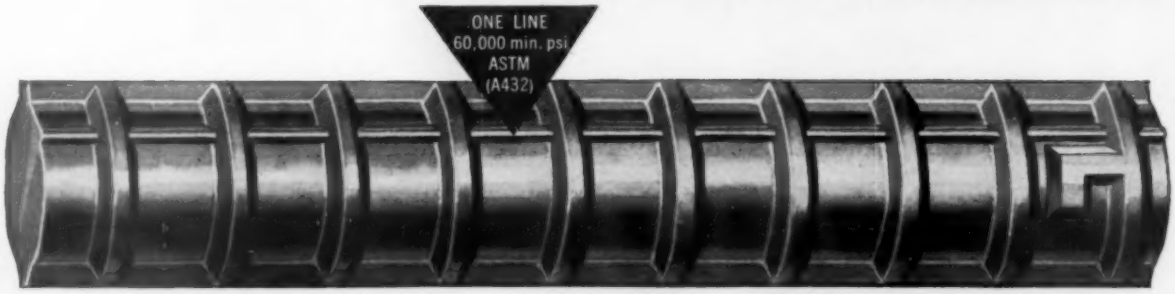
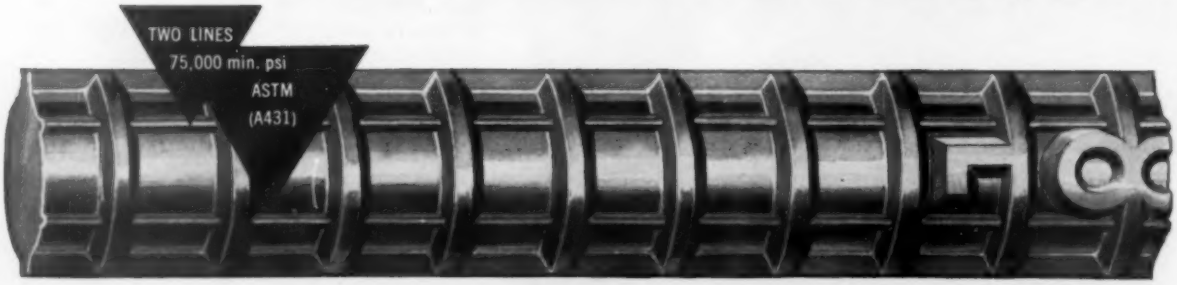


SHOW SIZE AND STRENGTH



OF EVERY LACLEDE STEEL REINFORCING BAR

fast, easy identification saves construction time and cost

Metallurgical research has developed high-strength steels that substantially improve the efficiency and economy of reinforced concrete design — saving as much as 15% of the total construction cost of the structure.

Laclede now brings you this steel reinforcement in new, easy-to-identify bars that can be used with assurance under the Ultimate Strength design methods of the A.C.I. building code. With this positive identification, the worker can quickly find the right bar specified for the job. The clear marking of the grade of steel minimizes the need for inspection and testing.

Specify these time-saving, money-saving Laclede bars for your next construction job.

LACLEDE STEEL COMPANY

QUALITY STEEL FOR INDUSTRY AND CONSTRUCTION

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Steel

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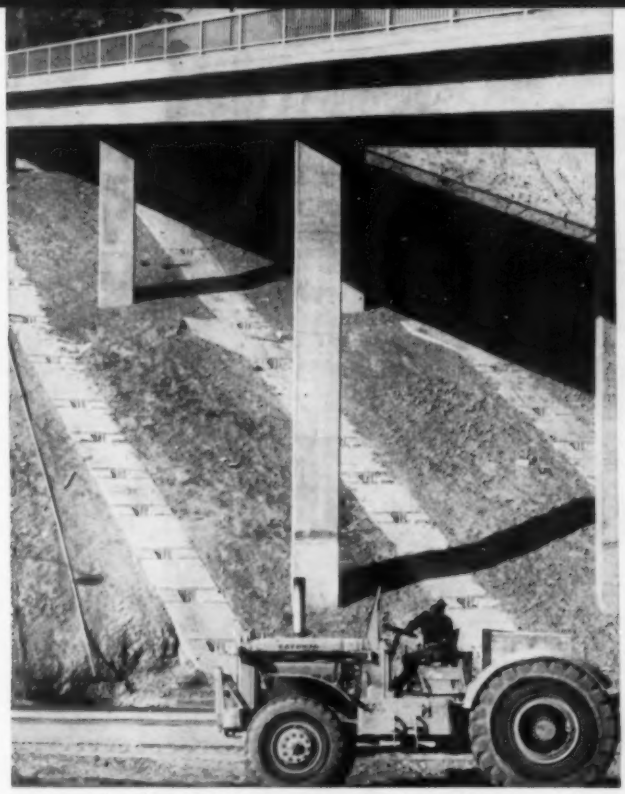


The completed sills which serve as anchor heads for tension rods threaded through concrete piles—unique answer to a slope stability problem.

Hydraulic stressing equipment in position on a rod.

Stress Rods Tie Down Unstable Cut Slope

A system of high-tensile-strength steel anchor rods has proved successful in stabilizing the cut slope under a California bridge. The structure is the Oakdale Road overpass in a freeway project near Walnut Creek, California. Charles L. Harney, Inc., the contractor took an active part in the solution involving the stress rods.

The scheme, briefly outlined, consisted of tightening down the earth slope under the bridge abutment, by means of concrete sills and tension rods anchored into cast-in-place piles. The purpose, in a sense, was to restore to the ground mass the compression that existed prior to removing the overlying material in excavating for the under-roadway. The undisturbed ground along this hillside area had proved free of excess ground water, whereas the immediate area quickly developed springiness and slide tendencies after removal of some 35 ft. of material.

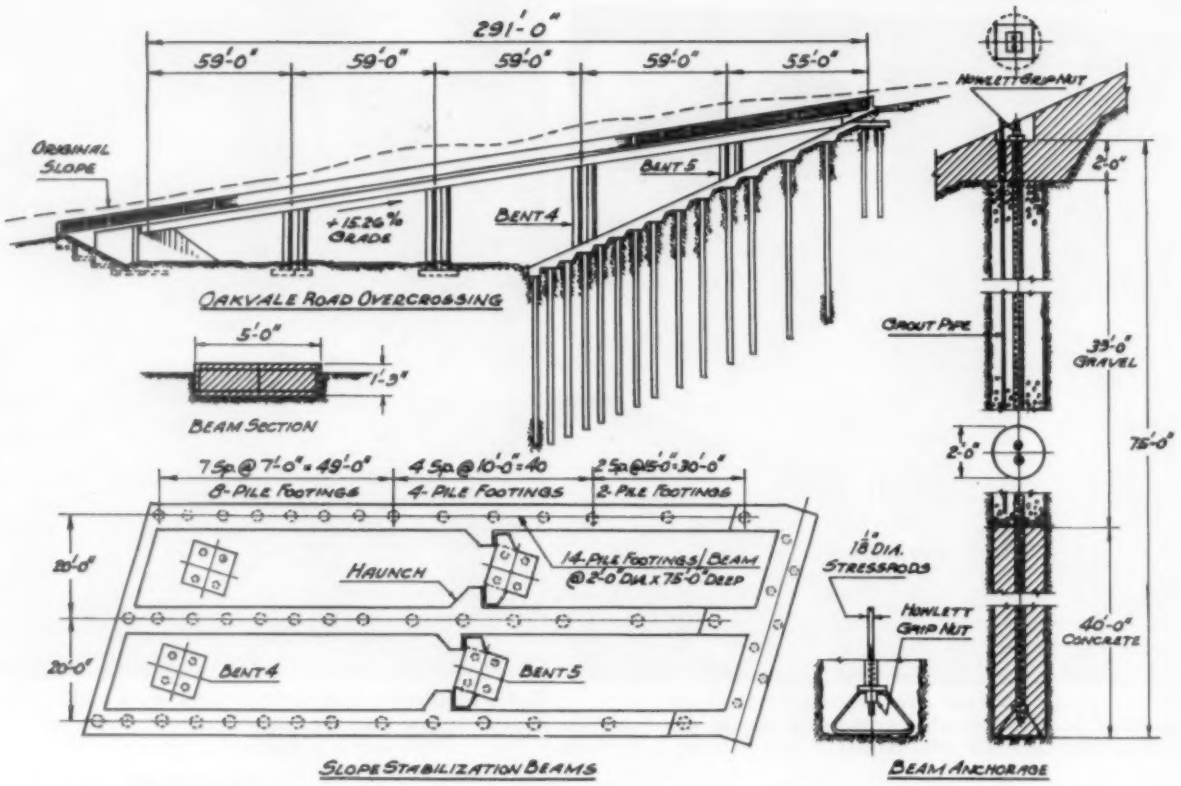
The bridge site had been chosen as an alternate rather late in the project's development. Preliminary soil studies however had showed the site to be a satisfactory one, requiring no special design to assure stability of the 2:1 cut slope. But as the grading progressed, trouble started to develop. Further soil borings were made, samples inspected by a geologist, and agreement reached that something special had to be done.

The instability of the cut was due primarily to a generally circular slip plane and an aggravating wetness. The borings had indicated that the slip plane passed below the elevation of the roadway at the toe of the cut and passed upward into an existing road at the top of the cut, behind the future location of the bridge top abutment.

The 150 ft. long cut slope could not be terraced because of private property adjacent to the top of the cut. Draining would not provide the required level of stability. Therefore, it was decided to stabilize the soil by reloading it to the compressive stress which existed prior to the excavation. The Harney organization's solution, to use stress rods, was carried out with approval and cooperation of the state of the state engineers. The rods used were the product of Rods, Inc., a California manufacturer, having been developed primarily for concrete prestressing.

Using these rods a load was applied to the slope under the bridge through three reinforced concrete beams, each 15 in. thick by 5 in. wide. These beams, poured flush with the cut slope, were anchored to the bridge abutment at the top and to a tie beam at the toe. The load was applied to the beams through 1⅛-in. diam. stressrods and transferred to the soil from the rods through 24 in. diam. concrete piles, cast in drilled holes.

The stress in the rods was cal-



General arrangement drawing showing plan and elevation of slope stabilization structure.

culated using an allowable soil stress of about 3 tons per sq. ft. The stressing system consisted of 14 piles to a beam with two rods to a pile, each rod being stressed to a load of 50 tons. The design called for 8 piles, spaced at 7 ft. and 4 piles spaced at 10 ft. and 2 piles spaced at 15 ft. for each beam.

Each rod was covered with a protective coating of mastic and was incased within a 3-in. 26-gauge galvanized pipe to prevent corrosion. The rods were seated at the bottom of the piles in 7" x 10" x 1⅜" steel plates, welded to special supporting chairs. Rods were seated at the top on 1⅜ in. plates embedded in the beams. Rods were made up of three lengths with couplings. Single full-length rods would have been too heavy to handle by the manual methods required.

The rods were not bonded to the concrete, except at the point of bearing at the base. Instead, they were kept apart from the concrete by the pipes, in order to facilitate future stressing. The upper 35 ft. of the 75 ft. deep holes was backfilled above the concrete with 1½ in. gravel.

It was decided that if any shifting of the soil were to occur after the job's completion, the shallow upper pier footings might move and cause the first bridge panel to fall. To provide against horizontal movement of the piers, interlocking side haunches were built onto the concrete sills (see sketch) as well as the pier footings.

The coupler used was the Howlett grip coupler and a nut made from Bethlehem 8620 alloy steel bar stock. The rods were loaded with 100 ton hydraulic rams which butted against the tops of the beams. Loads were applied in 10-ton increments, up to the total load of 50 tons to determine elongation settlement.

Stressing began at the bottom of the beams and progressed upward, each rod in the south row being loaded in turn to 10 tons. After all rods in the south row were loaded to 10 tons, the north row was stressed in the same manner. The process was repeated until all of the rods in the three beams carried 50 tons. All of the rods were then restressed to 50 tons to compensate for losses due to settlement and the differential loading.

Some three weeks later, the rods were again loaded to 50 tons, to account for the losses due to the continual settlement. The roads were left in a condition to accept the hydraulic rams so that future spot checks can be made of any further settlement.

Check measurements made since completion of the project have indicated little if any settlement of the slope. Since its completion, the installation has functioned with complete success.

The project was carried on under direction of the California division of highways, bridge department. The drilling was performed by the George F. Casey Co., of Berkeley, and the placement of the Bethlehem steel used was handled by the Gilmore Skoubye Co. The prestressing materials and equipment were furnished by Rods, Inc.

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TRUCK MIXERS

For years, Smith Mixers have been the standard for the ready mixed industry. In addition to the chain driven mixer, only Smith offers you the gear driven truck mixer, with extra life, less maintenance, and an extended five year warranty.

Another exclusive feature on all Smith Mixers is the T-shaped blade, with full mixing and discharge fins throughout the drum. These mixing and discharge fins provide speedier, more thorough mixing, and faster discharge times than any other mixer even on the driest concrete . . . good reason why Smith is preferred by contractors and inspectors alike on the tough jobs where low slump specification-type concrete is required.

Regardless of the size or type you choose — separate engine, front PTO, or flywheel PTO — your Smith truck mixer is custom engineered to meet your specific job requirements.

For even greater payload in areas where weight restrictions are critical, Smith offers a complete range of aluminum components.

Get in touch with your Smith distributor today! See what a new Smith truck mixer can do for your operation . . . in terms of capacity, operation and lower maintenance costs.

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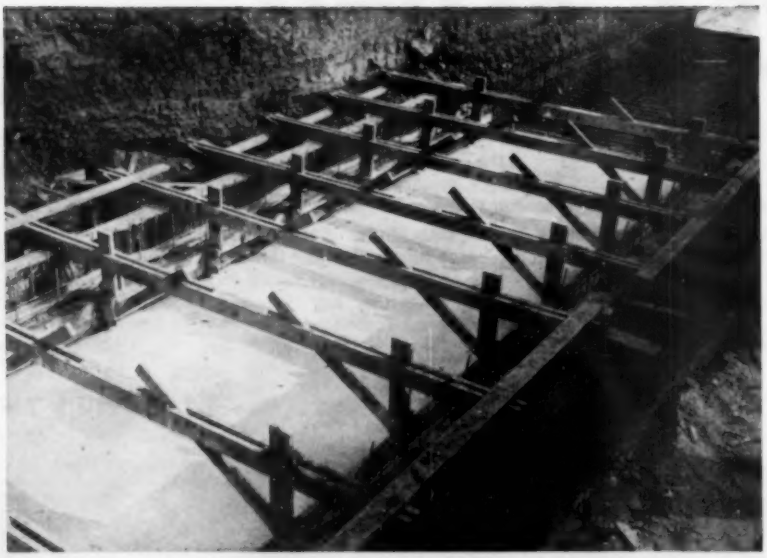
Three sets of 16′ 8″ inner forms seen in place on the invert, lacking only taper ties, cross ties and the spanner plate over the opening separating the two halves.



The invert form unit in place showing simple, sturdy framework that supports the 3″ x 12″ starter wall form and knee braces. Extension of cross-member 2 x 6s provides a method of accurately locating and securing the invert form in place.

With the inner forms in place, truck crane lowers 16′ 8″ sections of outer forms into cut. Panels are kept from spreading during pour by taper ties running through forms from whalers on 4′ 3″ vertical spacing, 5′ 8″ centers.

Using six Simplex screw jacks, this crew quickly set a 16′ 8″ section of inner wall form and deck form after rolling the section in place on swivel casters.

LEAP-FROGGING FORMS

Continued from page 52

in place by pressure on the starter wall form. A light timber trestle 16′8″ long supports the two starter wall forms and knee braces. At the same time it accurately positions the form in relation to preset exterior starter wall forms.

The caster-mounted inner forms for the box are built of 2 x 6s and 4 x 6s with longitudinal whalers on 4′3″ spacing. Each of these 16′8″ sections make up the iner wall form and a portion of the deck form. A heavy steel spanner plate bridges the deck gap between the inner sections when the forms are in place. Taper tie holes with steel cheek plates at 3′8″ centers provide means of holding proper spacing between the inner and outer forms.

Because each of these units is interchangeable, there is no problem of form mixups when stripping and relocating form sections further along the pour. The individual units, once in position, are tightly pulled together with bolts. Where the culvert turns—and there are a number of turns, one of them with a 375-ft. radius—the 16′8″ sections are short enough for a reasonable chord. Spacers comprising 2 x 4s, 2 x 6s, 2 x 10s, etc., placed between the ends of adjoining form sections keep the forms of the longer radii in acurate end alignment, with the forms making up the inner arc of any turn.

Additional time is saved by using a "hot pour" (fast-hardening) concrete with 2 percent calcium chloride, aided by high-frequency vibration. This allows forms to be stripped in a maximum of 72 hours.

How fast is this? Each 50-ft section (not including the previously poured invert) takes over 100 cu. yd. of concrete and nearly 10,000 lb. of steel. The progress averages three such pours per day—one on each of the 150 ft. headings. A crew can easily strip, relocate and set a 50-ft. section in a day.

The simplicity of design and interchangeability of both the inner and outer forms makes manpower requirements relatively easy to solve. The foreman in charge of the box culvert work notes that all of the labor on the job came from a local hall, the men being completely without experience in this kind of forming operation. Within a week they were working as a smooth team.

T.L. SMITH BATCHING PLANTS

When you purchase a Smith-Gregco batching plant, you get more than just modern concrete equipment. You get a truly modern concrete plant that is individually engineered, by experts in their field, to meet your particular needs.

Experienced Smith-Gregco engineers take time to visit your proposed plant site, determine all the factors that will affect your operation. They give you technical advice and help in selecting bins, batchers, conveyors, silos, and control equipment that will go into your plant.

But, no matter what type or size of plant you specify, you can be sure of getting the latest, most up-to-date plant design . . . a design that has been developed, perfected, and proven in hundreds of installations to provide fast, accurate batching.

Batching plant sizes range from 30 to 600 tons — with manual, semi-, or fully-automatic electronic control systems. In addition, Smith-Gregco offers a complete central mix plant — using either the turbine or the tilter — with a single source of engineering and supply, a package that can't be beat.

Whatever you're now considering in terms of new equipment, it will pay you to get in touch with your Smith-Gregco distributor.

SMITH **THE T. L. SMITH COMPANY**
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1 Showing standard specimen and split metal mold.

2 How specimens are formed.

3 Finishing the specimen.

Concrete Strength Depends on Testing

The compressive strength of concrete, probably the most widely accepted quality control test, is dependent upon the proper casting and curing of the test specimens.

As an aid the contractor, ready-mix operator and others interested in this test, Soiltest, Inc., testing equipment maker, has prepared this photo series and brief instructions.

1. Compression test specimens are usually cylindrical, with length twice the diameter (standard is 6 in. diameter, 12 in. length for 2 in. maximum coarse aggregate). Molds shown for these test specimens are of metal and have a machined metal base plate. For easy specimen removal, molds are split longitudinally and held in the closed position by quick-acting clamps.

2. The specimens are formed by placing the concrete in the mold in three layers of about equal volume. Each layer is uniformly rodded with 25 strokes.

3. Where voids are left by the tamping rod, the sides of the mold are tapped to help fill the voids. After the top layer has been rodded, the surface of the concrete is struck off with rod or a straight edge. (Test specifications covered in ASTM C-31 and AASHO T-23.)

4. Specimens are covered with a glass or metal plate to prevent evaporation, then removed after 24 hours and stored under moist conditions. In field laboratories, special curing cans are frequently used for storage and curing.

Performing this familiar test with consistent accuracy is often 'money in the bank' to the contractor, and proof of specification compliance to all concerned.

4 Specimens covered during storage.

Publicity Committee for 1963 Road Show

Donald V. Buttenheim, President of the Construction Industry Manufacturers Association and Chairman of the Construction Equipment Exposition and Road Show, with Co-Chairman Harvey A. Scribner announce that appointment of members of the publicity committee for the coming Construction Equipment Exposition and Road Show has been completed. The committee: Donald V. Buttenheim, Buttenheim Publishing Co. (Ch.); Harvey A. Scribner, Russell T. Gray, Inc. (Co-Chair.); J. T. Jenkins, Jr., ARBA; J. M. Sprouse, AGC; G. M. Reveire, International Road Federation; A. A. Faber, Associated Equipment Distributors; J. A. Wicke, Iowa Manufacturing Company; M. P. Jaeger, Koehring Company; M. L. Crawford, Frank G. Hough Company; H. Kenyon, Andrews Agency; D. L. Cronk, Highway Information Services.

T.L. SMITH CONCRETE MIXERS

For the ultimate control in a central mixing plant, Smith offers both turbine and tilting mixers. For most jobs, the turbine — with sizes ranging up to 3 cubic yards — can supply concrete faster and at less initial over-all cost than any other mixer. The one minute cycle time gives high output with even the smallest plants. And the basic design permits discharge in any of four directions, so one turbine can often be used in a multi-operation plant that would normally require two or more mixers.

Best of all, because the Smith Turbine is compact, lightweight, and vibration-free, you can install it in your present plant with minor alterations . . . replace your old, worn out mixer with a high capacity Smith Turbine for far less than you would ever guess! Or, it will allow you to convert your batching plant to a modern central mix operation with very little added investment.

On the big construction projects, the Smith Tilter — with sizes from two to ten cubic yards — will more than meet your heavy duty requirements. For years the Smith Tilter has been used in large ready mixed plants and on dam jobs throughout the world. Whatever your mixing problem, the Turbine and the Tilter give you the perfect combination from which to choose.

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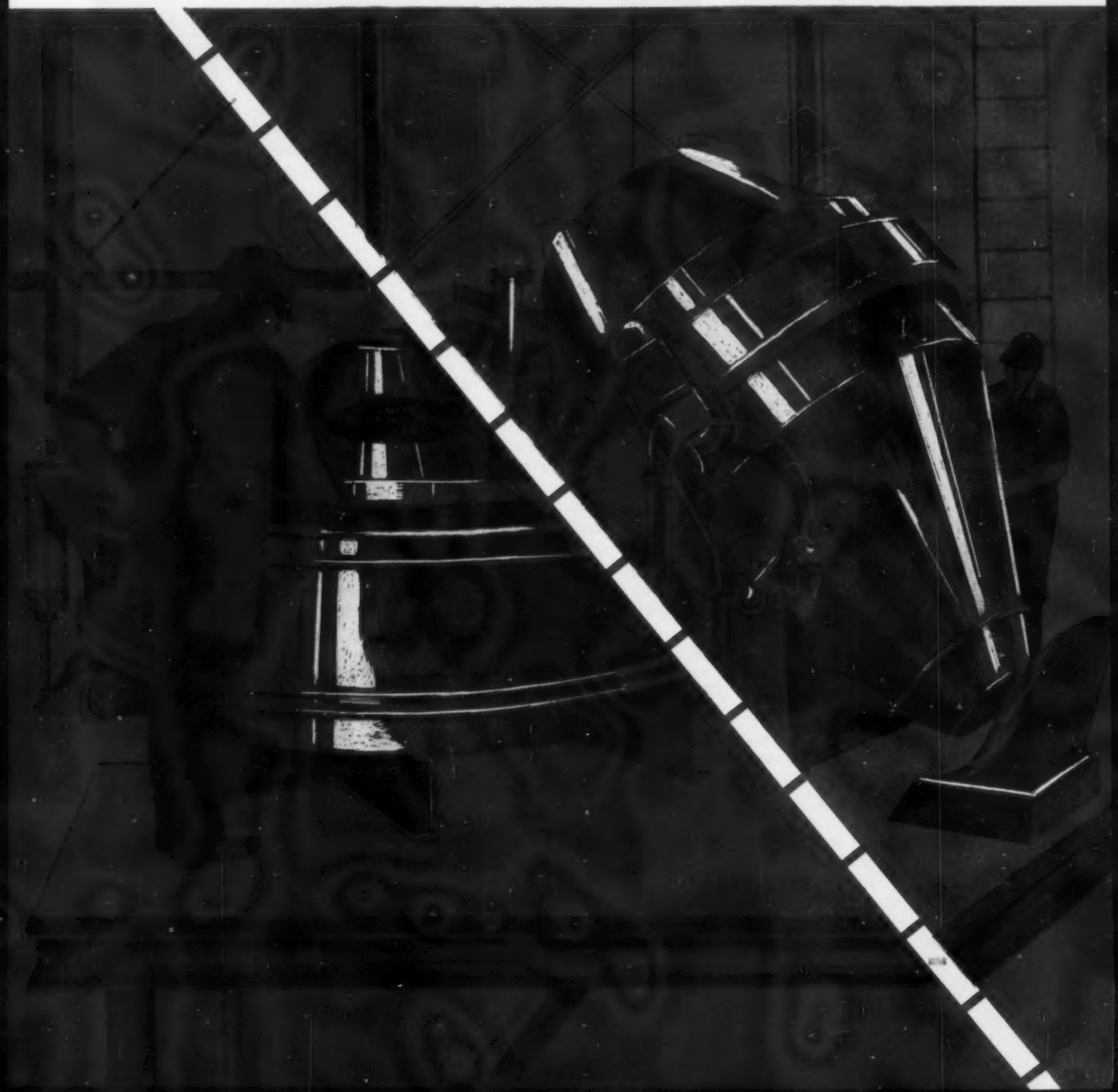

In the painting bay—a two-tractor-sized wing recently added to the Hendrickson shop facilities.

The nerve center of the Hendrickson shops is in this office, where shop foreman, Charles Czik is seen waiting for a radiotelephone call-back.

CENTRAL REPAIR SHOP

Continued from page 48

the shop, but vulcanizing and recaping are farmed out to specialty shops.

The extent of tire activity with a company of this size is shown by the fact that thirteen new tubeless large earth scrapers were changed tires for large earth scrapers were changed in a single recent month. About two thousand tires are in use at any given time, in cluding all equipment down to small trucks and pickups.

4. Main shop. This area has several bays for tractors and other heavy units, surrounded by a welding work area and the usual mechanics' benches. The equipment on hand includes a 150-ton press (Lemco), bench-mounted grinders and buffers, a drill press, metal saw, and limited equipment for engine work including valve grinders—again a compact setup not designed for all-out overhauling but for the next thing to it, however.

5. Greasing. Alemite shop equipment for grease dispensing is kept in the main shop, and grease and lube attention made a systematic part of all handling of equipment brought in. Systematic records on this work are kept by the men in the shop and by the field service crews. These records are in accordance with well established "PM" routine —except, that the management is tougher than most in seeing that the routine is followed and that records show the servicing history of each major machine.

Field trucks for lubrication and greasing service, as well as light repairs, gas, water, etc., are assigned to a single project or make the rounds to several smaller projects.

6. Welding. This work is on a more extensive and self-contained basis than is seen with many contractors. The company people believe in the valve of investing rather heavily in hard-facing, among other things. Stainless steel build-up of bucket teeth and lips, and of trencher buckets, was going on when these photos were taken. Some hard-facing is also done in the field when equipment is not actively working, on an opportunity basis.

The main shop has four electric welders (Lincoln, Hobart, G-E) for welding and hard facing, in addition to welders on the jobs. A fact of life with any heavy equipment fleet is the large amount of body and miscellaneous structural repair work htat is found necessary. This type of renovation is reflected in the firm's completely restored, "like-new" equipment, seen stored in the yard awaiting assignment.

Fuel. Fuel for yard and shop activities and for equipment traveling in and out is stored and dispensed at a modern gasoline-diesel dock in the yard. Three semi-trailers or trucks are fitted as fuel tankers. One for example is an International BC-180 tractor-trailer unit which carries 600 gal. of gas and 1,200 gal. of diesel. In addition, the company is served often on a direct fueling basis by the refiner's trucks at the projects.

Painting. A modern adjunct to the shop is a painting room large enough for two heavy tractors at a time. Equipped with modern roll-up doors, ventilation, and DeVilbiss spray equipment, this room was planned with an eye for worker safety as well as efficient handling of the important pre-painting part of the shop routine. The company sees to it that overhauled equipment goes out with new paint, as a matter of good equipment care as

Continued on page 134

T.L. SMITH
PLANT MODIFICATIONS

MODERNIZE WITH CONFIDENCE! You can upgrade your present plant and obtain the improvements you require in plant capacity and operating economy by calling in T. L. Smith!

Smith-Gregco engineers will give your operation their personal attention, working with you to determine just how new Smith-Gregco automatic or semi-automatic controls, bins, conveyors, batchers and cement handling equipment — including air systems — can be incorporated in your present batching plant set-up in the most effective and economical manner possible.

This kind of personal approach to your particular plant problems means you'll get outstanding plant performance at the lowest possible cost.

For prompt, personalized engineering help, call your nearby Smith-Gregco distributor. You'll like the way he takes a real interest in helping you bring your plant operation up to today's performance standards . . . Smith-Gregco standards!

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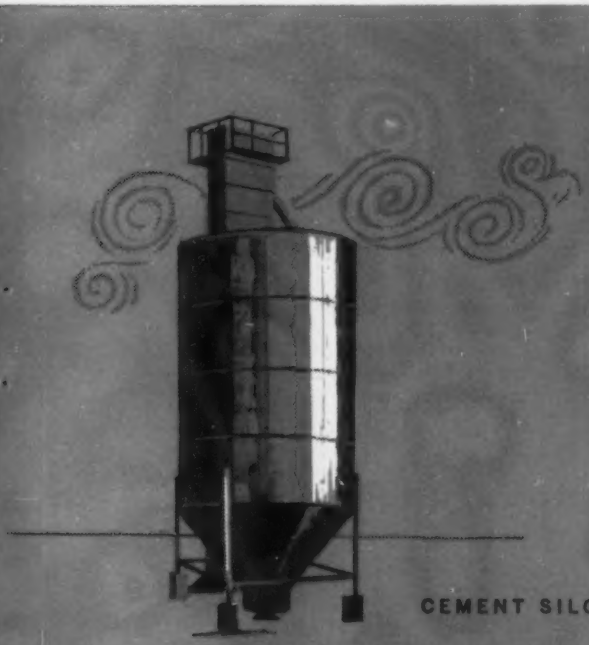
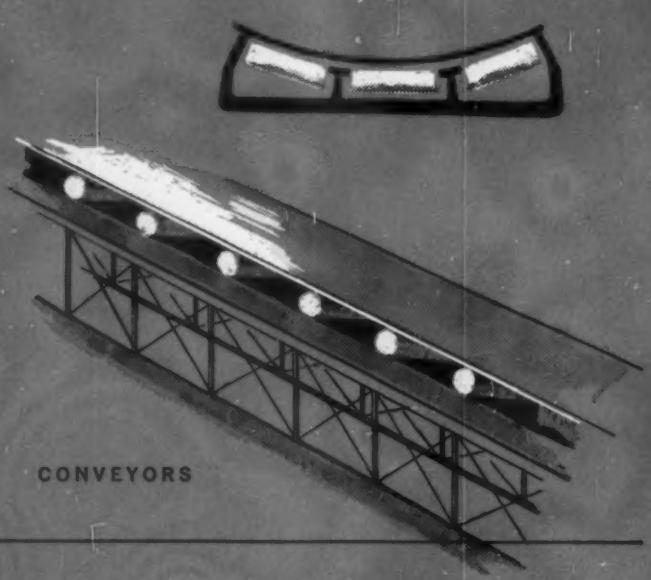


CEMENT SILOS



CONVEYORS

BATCHERS

CONTROLS

"The Library" in the Hendrickson shop office. Parts and their purchasing, keeping on hand and dispensing to mechanics are vital to the firm's mechanical management.

Seen atop the Hendrickson main offices at Valley Stream, N. Y., is this 125 ft. high radiotelephone mast. The company utilizes one bay station, 2 relay stations and 33 mobile two-way radio units.

←

CENTRAL REPAIR SHOP

Continued from page 132

well as pride and employe morale.

The shop management centers in a small office here pictured—actually a corner centrally located with respect to the parts and supply commissary and two of the main shop areas. Here Clifford Smith, the firm's master mechanic, and Charles Czik and Al Penn, day and night foremen, and Linn Weiser, parts manager, hold forth with the help of several telephones and the every-handy RCA radiotelephone. The shop force in winter included 12 to 15 mechanics, 4 or 5 welders and 8 or 9 helpers, not to mention drivers always on the road with equipment. The summer work force is little if any smaller.

The office control system for mechanical work is built around a Kardex file. Occupying several file drawers, this system provides complete and up-to-the-minute records

Continued on page 136

T. L. SMITH

MARK IV ASPHALT FINISHERS

Here's the hottest finisher on the market today — the Smith Mark IV! — currently making road-builders' eyes pop in a series of remarkable demonstrations across the country.

They're seeing an 8-rubber-tired machine that has enough flotation and traction to roll easily along laying asphalt on even the softest sub-base; a machine with six wheel power steering that lays a smooth mat on snakelike S-curves without gaps or thin spots on the outside curve, and that won't "curb-bind" even on narrow, curving residential streets or in alleys. It has speed and maneuverability a track-laying machine can't even begin to match — and, best of all, there's none of that high-priced track maintenance!

Other unusual features include a swept back screed with automatic feed that lays a smooth, full-depth mat evenly across the entire width of the machine, even at speeds over 100 ft/min . . . and a "magic carpet" seat that swings the operator and controls from one side of the unit to the other at the push of a button for clear view of the work.

Why not have a personal demonstration — on your own job! Write or call your local Smith Distributor . . . he'll arrange it.

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A specialist spends nearly full time splicing cable for slings or other usages requiring cables.

Wire rope lengths cut, fitted at ends where necessary and otherwise made ready for use on various cable-operated types of equipment.

Wire rope slings, made up in the firm's shop and waiting use.

CENTRAL REPAIR SHOP

Continued from page 134

for each unit owned. Each machine's history of repairs, servicing and cost charges are readily available to the management. These records tell the management when a machine is costing too much for repairs and is ready for trade-in.

Parts and their stocking and use are also covered in the shop office system. When a part is requisitioned by the shop force, it is taken out of stock and a replacement part immediately ordered. Thus a "perpetual inventory" of parts and supplies is kept on hand, sufficient for most needs. This insures that a part will be on hand *immediately* ready for emergency. The shop night force, having a needed part on hand, can have the repair done by daylight.

Out in the yard, Hendrickson's equipment is protected variously from the weather—here plastic over wood framing, and (at left) tarp covering with tie-down.

Fuel barrels stored in recommended on-their-sides position in the company yard, for quick dispatching to work areas not supplied by tankers.

In the main yard, steam cleaning a Gradall with steam supply from a Chem Therm unit.

Seen along a property-line wall in the shop yard—drag line bucket, chains and towing chains in all sizes.

The total value of parts, accessories and supplies kept in this inventory is a confidential figure. The firm does have many thousands of dollars in parts, while keeping the inventory trimmed down carefully to a practical "get along" basis.

The "Catolog Library" is a rather interesting sight in the shop office, reflecting in its own way the size and complexity of a contractor's mechanical management problem these days. The Hendrickson policy, like that of many other firms, is to limit the number of different makes for a given type of unit, so as to simplify the mechanical job. Nevertheless, numerous manufacturers are represented in the stack of factory and dealer catalogs, which are filed by manufacturer on spacious shelving.

Diesel and gasoline dock in the Hendrickson shop yard. A large gallonage is dispensed here from safe underground storage, for the company's many autos, pickups, delivery trucks and trailers.

Exterior of the paint shop. Note modern roll-up doors, and also vents.

NBCA's Quality Program 'On Schedule'

Hot-mix contractors at Houston convention hear progress report on quality research, as Association girds for continued growth and progress.

The quality improvement program of the National Bituminous Concrete Association is moving according to plan. Some of the details of this research and a review of several problem areas made news as 800 delegates gathered at Houston, Jan. 28 through Feb. 2, for NBCA's sixth annual meeting.

More specifically the audience heard, among other things:

That high-priority projects in the original 10-point quality improvement program were in action at the Association's new national research center, located at Texas A & M College's Institute of Transportation at Bryan.

That a beginning has been made to coordinate NBCA's and state associations' bituminous pavement research work with that of the state highway departments.

That effective cooperative relationships are being worked out between NBCA and other associations, including the AGC and particularly with The Asphalt Institute.

That this association, dedicated primarily to a betterment of its product – bituminous pavement – has continued to grow, now numbering over 700 contractor members under 27 state associations, with affiliations and support from a growing list of equipment manufacturers and material groups.

The year's accomplishments of NBCA since its Detroit meeting, as reviewed by retiring president, Bryant M. Collins of Austin, Texas, committee chairmen, and staff members included several points of interest. Due to budget limitations, the scholarships originally planned were dropped, but work was launched on high-priority tasks:

1. The survey of literature in bituminous concrete, following a pilot study of a small segment of Highway Research Board papers in 1959, continued with a review of remaining pertinent articles and a revision of the system involving coded IBM cards. Miller-Warden Associates which has handled this important work will check the adequacy of the system during 1961 and start coding information on other literature beginning with proceedings of the Association of Asphalt Paving Technologists.

Publishing of Corps of Engineers design criteria for heavy airfield pavement in a form applicable to interstate highway loadings was planned by NBCA, as a design guide for highway engineers. The Corps has OKed the use of its published data and manuals, and is currently revising its design manual. When published this work will be available to NBCA, which sponsored a meeting of consultants on bituminous mixes. General agreement was reached on procedures for translating Corps data downward to highway loadings and repetition patterns. Publication of a design guide will await completion of current Corps studies and the results of the AASHO Road Test.

2. NBCA participated during 1960 in a study on "Rheologic Characteristics of Bituminous Concrete," under the Ohio Research Council at Ohio State University, with the Bituminous Concrete Producers Association of Ohio also participating.

3. A study of allowable moisture in hot-mix, one of the high-priority technical projects, made a start in 1960. The first step planned was to check the postulation that moisture found in pavements in service is above the limits of many state specifications. If this were established, it could be a basis for asking certain states to review their specification requirements. Tests were completed by Chicago Testing Laboratories on samples from six states, with other states soon to be represented.

Continued on page 140

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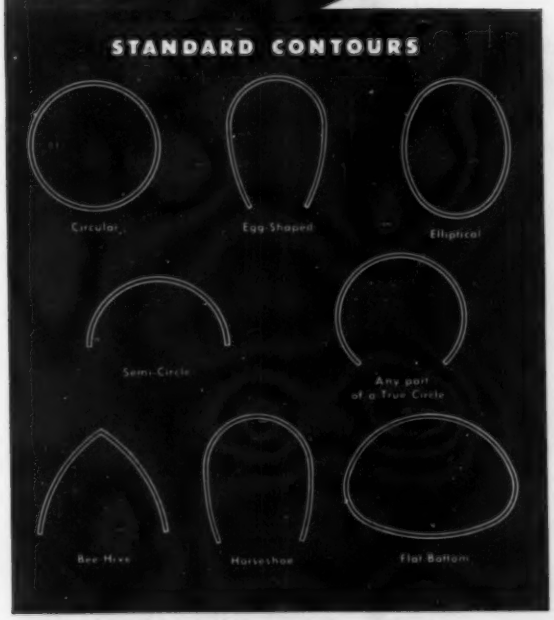

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NBCA'S PROGRAM

Continued from page 138

All samples tested to date show significant amounts of moisture. A test report will be made on this study, which will be continued in 1961 to determine the effect of aggregate type and gradation on the limiting moisture content at which steam is trapped in the mix.

4. Improvement of pavement riding qualities was the objective of a study agreement entered into with R. L. Peurifoy, Construction Consultant, of Bryan, Texas. The purpose is to appraise various devices available to help lay hot-mix pavement to a predetermined profile. A report is expected soon. This work is continuing in 1961, with expectation that recommendations will be made to equipment manufacturers on results desired through automatically controlled laydown. Field trials will be sought in cooperation with local associations and state highway departments.

5. Effect of aggregate coating on hardening of asphalt cement was budgeted for 1961 study. Two cases which seemed to warrant study were seen by research coordinator Foster, and samples from one site were tested by Miller-Warden Associates. No direct correlation between such hardening and observed behavior was obtained, and further tests are planned. The extent and seriousness of this problem will be ascertained, and possibly a specification test developed.

6. Studies of asphalt cements, on the original high-priority program, began late in 1960 at Texas A & M College. This work will be concerned chiefly with identifying asphalt cements which can be used at optimum production rates, as compared with those which must be used at slower rates because of slow setting characteristics or other features.

The long-range objective of this study is to learn more about asphalt cement as related to speed of pavement production, loss of life in the mixing cycle and on the road, resistance to fatigue cracking, and resistance to stripping due to water. The 1961 work will include study of viscosity-temperature relationships for maximum production, and of anti-aging agents. Also a study will be made of physio-chemical characteristics desired in a bituminous binder, including a comparison of such characteristics with those of existing asphalt cements. The work will include exploration of new avenues of approach.

7. Workmanship of contractor members, a key subject with NBCA, took up considerable space in the annual report. During 1960 the contractor members were questionnaired on the role of good workmanship in their businesses. Come of the findings:

Workmanship is generally believed to have a greater effect on the quality of the finished pavement than on rate or economy of production. *Most* contractors today have some system of encouraging high quality work by their employes. However many contractors also rely on the engineers to help in evaluating the quality of workmanship.

Two-thirds of the contractors replying have an employe training

Continued on page 144

Leffingwell heads NBCA

Fritz Leffingwell, president of Asphalt Paving Company, Miami, Florida, is 1961 president of NBCA. J. A. Woodworth, of Woodworth & Company, Inc., Tacoma, Washington, is vice-president.

Allen Snyder, of Hefler-Snyder Company, Garwood, New Jersey, was re-elected treasurer, and Stanley S. Watkins, Bituminous Surface Treating Company, Inver Grove, Minnesota, continues as secretary.

Pres. Leffingwell heads the Association's 12-man board of directors for 1961.

Richard R. Stander, of Mansfield, Ohio, continues as chairman of the 12-man Quality Improvement Committee, with Stanley S. Watkins, vice-chairman, and J. Rogers Martin, secretary.

On NBCA's national staff, H. K. Griffith is executive director, with offices at 1145 Nineteenth St., N.W., Washington 6, D.C. Charles R. Foster is research coordinator, with headquarters at Texas A. and M. College, College Station, Tex.

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Through Research and Engineering . . .

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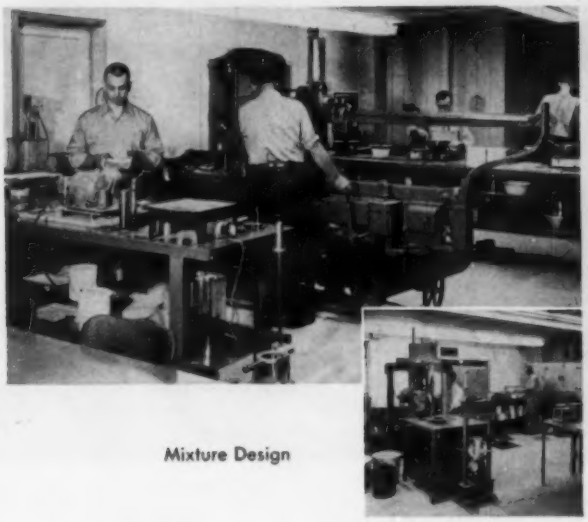

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The McConnaughay Central Laboratory is designed for research, formulation, product control and development of asphalt paving processes and products. Equipped to run all recognized tests on bituminous materials and mixtures, it also carries on long range studies to improve present testing methods and to solve general paving problems. Working in close association with road builders, highway engineers, and the Licensees, the Laboratory is able to put findings to practical tests in *field appraisals* . . . where performance counts!

For more information on the Central Laboratory and Licensee field service . . . write for this new folder, or call your nearest McConnaughay Licensee *(list on opposite page)*.

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Model 774 shown with standard 5'6" depth, 30" width wheel. Optional model digs to 7' depth.

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The big difference: Hydra-Crowd transmission that lets you instantly dial maximum crowding speed for any ground condition

Barber-Greene wheel ditchers obsolete all others digging to 5'6" and 7' depths by out-producing them from 25 to 100% every day. And your Barber-Greene delivers a peak production pay-off in: 1) variable ground conditions; 2) frost, caliche, and hard pan-type; and 3) sticky gumbo-type digging.

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More Barber-Greene exclusives that contribute to precision performance with lowest cost of operation include:

- Flexible drawbar between chassis and boom continually absorbs digging shocks, reduces transfer of twist and tilt from wheel to chassis when digging curves or over uneven ground.
- All-hydraulic spoil conveyor independent of wheel speeds for instant selection of infinitely variable speeds—instant reverse.
- Hydraulic controls give greatest accuracy in digging to line and grade.
- Crawlers are easily adjusted in one-tenth the time of ordinary crawlers.
- Automatic overload guard, hydraulic brakes and hydraulic wheel hoist protect both man and machine.

Call your Barber-Greene distributor for your on-job demonstration. You'll get proof why you can't afford to dig ditch with any other machine.

Model 772 digs to 5'6" depth in cutting widths from 10-24". Model 773 is identical except for wider track gauge pad widths.

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(Left): B. E. Lathrop, chairman of NBCA's Board of Governors. (Center): Bryant M. Collins, retiring president of NBCA. (Right): Hugh McMillan, of Hugh McMillan, Inc., El Paso, who chairmanned NBCA's Houston convention. He was aided by vice-chairman W. T. Milam, of Hunter Construction Co., Oklahoma City, and by B. L. Faltinson, secretary of the Hot Mix Association of Texas, Austin.

National officers of NBCA: Stanley S. Watkins, vice president of Bituminous Surface Treating Company, Inver Grove, Minn., re-elected secretary; Fritz Leffingwell, president of the Asphalt Paving Company, Miami, Fla., new president; Allen Snyder, president of Hefler-Snyder Company, Garwood, N. J., re-elected treasurer; and J. A. Woodworth, president of Woodworth & Company, Inc., Tacoma, Wash., new vice president.

NBCA's PROGRAM

Continued from page 140

program. Technical men from supplier organizations help in this effort in many cases.

A merit system rewarding employes for high work quality is reported in effect by 41 percent of the contractors replying. Bonus and wages increases are often in the picture.

What the contractor would do about cases of poor workmanship brought mixed replies. Some contractors said they would correct the poor pavement, others "if required to." Two showed a reluctance to admit the existence of poor workmanship. Some would fire the workers that were to blame, while others would make an effort to show the workers how to help produce better pavement quality.

This topic continues in NBCA's 1961 program, with three items: (a) study and report on the effectiveness of merit systems as used by contractor members, (b) prepare training films and other aids for operators and laborers, (c) study and recommend on a particular quality problem, i.e., the most acceptable procedure for constructing longitudinal and transverse joints.

NBCA's Continued Research

The Association's 1961 research work, partially covered in the foregoing, is within the targets set up in its original 5-year program. Continuing work is scheduled on the literature survey, merit systems for employe quality incentive, pavement riding quality, asphalt cement characteristics, moisture in mix, and effect of aggregate coating on cement hardening. This work has an $80,000 budget. Another $75,000 is budgeted for new studies selected for the original "Priority 1" items set up a year ago. The subjects singled out are workmanship, mixing time, rolling asphalt to produce a dense surface, and effect of mixing temperature on durability. Also scholarships will be financed in the 1961 budget.

All in all, the NBCA is committed to a five-year effort in which some $1,343,000 will be spent chiefly in quality research.

Liaison has been effected between NBCA and The Asphalt Institute in this program. A meeting was held on thickness design for heavy duty roads (Institute's Committee 4). NBCA's Quality Improvement Committee met with the Institute's Project Committee chairman and staff in December, when each group's activities and plans were reviewed. Research coordinator Fos-

ter also met in January, 1961, with John M. Griffith, the Institute's research engineer, to discuss means of closer coordination. Griffith participated in the Houston program, reviewing the Institute's present and future research in asphalt materials and uses.

Closely related to the Association's quality program was the paper by Traxler, Galloway and Benson of the Texas Transportation Institute on this agency's role in asphalt paving research. This review, presented by Dean Benson, covered asphalt quality as well as mix design. With respect to asphalt quality, Dean Benson suggested three possible approaches where problems exist: closer selection of source materials, alterations in the refining process, and use of additives which inhibit oxidation and polymerization of asphalts (a new field of study).

Another session topic which drew intent listening was one which focused on black base construction methods and problems. With J. E. Robertston, of Austin Contracting Co., Austin, Texas, as chairman, and Spencer J. Buchanan of Texas A & M College, as moderator, this session included prepared papers by R. L. Peyton, assistant state highway engineer of Kansas, Talbot S. Huff, design engineer, Texas Highway Department, M. Clare Miller, president of AGC and head of San Ore Construction Co., Kansas, and William H. Ford, of J. R. Ford Co., Inc., Virginia.

Speaker Miller and others urged greater utilization of bituminous bases as a means of producing high-type heavy-duty pavements at a saving to the taxpayer.

A further evidence of the extreme interest of the NBCA leadership in emphasizing good engineering and work quality was the appearance on the program of F. N. Hveem, engineer of materials and research, California Division of Highways. He described the Sand Equivalent Test, which he originated, and explained its usefulness in the design and control of bases and pavements.

Another highlight was a review by Fred Burggraf, Director, Highway Research Board, covering the scope and purposes of the AASHO Road Test. Results of this test are now being evaluated for a report due early in 1962. Many findings of great value to pavement designers will eventually be made public. Burggraf hinted at one or two, including a corroboration of the WASHO test finding that paved shoulders add substantially to the durability of the road pavement.

Manufacturer Panel

Again at the Houston meeting, NBCA delegates heard a panel of equipment leaders discuss latest developments. Covering both plant operation and paving methods, the panelmen were led by H. A. Radzikowski, Chief, Division of Development, Bureau of Public Roads, Washington, D. C. Under this foremost proponent of new methods and better specifications, asphalt plant topics were taken up by Ash Barber, of Barber-Greene Co., M. B. Preeman of Standard Steel Corp., Richard Bartell of Iowa Manufacturing Co., Arthur D. Farrand of Hetherington & Berner Inc., with a consultant board consisting of R. N. Birdsall, of Bollard Asphalt Plant Div., of Colonial Iron Works, Donald B. Palmer of Pioneer Engineering Works, Inc., J. F. Dorris of

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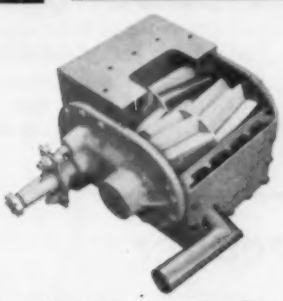

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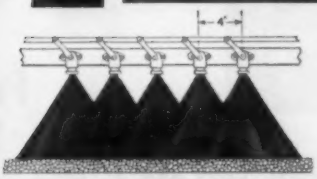

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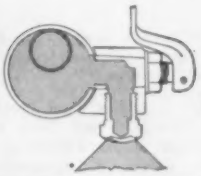
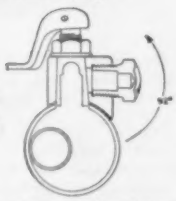


Cross section shows new TUC Bar with valve and nozzle in spraying position.



Cross section shows bar rotated 92°— valve completely drained.

Notice that no part of valve extends into bar to reduce circulation.

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Simplicity System Co.; and Alex Kostyzak of Madsen Works.

Paver developments were reviewed by panelmen W. A. Clayton of T. L. Smith Co., Jerry G. Watters of Iowa Mfg. Co., E. H. Holt of Barber-Greene, and James H. Cougler of Blaw-Knox.

The detailed comment of these experts will be available later in the published minutes of this valuable session.

Asphalt Mix Producer Has Own Quality Program

When individual tanker loads of asphalt cement vary "all over the lot" in qualities affecting pavement characteristics, yet pass the usual penetration and other standard tests, what's to be done?

One of the nation's largest asphalt paving companies, Industrial Asphalt of California, Inc., decided to answer this problem by setting up its own research program. This company with 35 plants in the Los Angeles area has a large "grocery store" business, selling mix for storage areas, driveways and parking lots, as well as to subdividers, municipalities and other government agencies for roads, streets and alleys. A persistent trouble has been plaguing this company. Mix sent out on Monday would set up quickly into a stable pavement. The same mix produced on Tuesday using the same asphalt grade would result in a pavement that took several days to set up or that would not support heavy static loads on hot days.

Particularly wanted for such uses as storage area pavements, parking lots, etc., was a pavement that would stand up under static loads at varying temperatures.

A feature of one session at NBCA's Houston convention was a report on this problem and what was done about it. E. J. Woodward, vice-president of Industrial Asphalt, California, Inc., described research which led to the development of this firm's "H L R" mix. This promotional name is given to a high-load-resistant mix formula which utilizes a penetration type asphalt currently produced by refiners to this company's special specifications.

The company originally established its own testing facilities to check gradations and mix design. It didn't test asphalts, since they met state highway specifications. When the testing was extended to include comparative studies related to the asphalt, "considerable and shocking differences" were found between the same grades of asphalt products being sold to commercial mix producers today in the Los Angeles area. Next came more intensified research, this time to compile data on the reactions of temperature and loads on paving asphalts

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Tarco's Slurry-Spreader is bolted steel construction . . . adjustable in widths from 12 feet to 6 feet. Two *slurry*-leveling blades: one semi-rigid; one flexible rubber adjusts to pavement contour by 7 quick-acting ratchets. Completely equipped: heavy *drag* chains; 2 pneumatic-tired traveling wheels; sprinkler; telescoping tow bar operator's *cat walk*.

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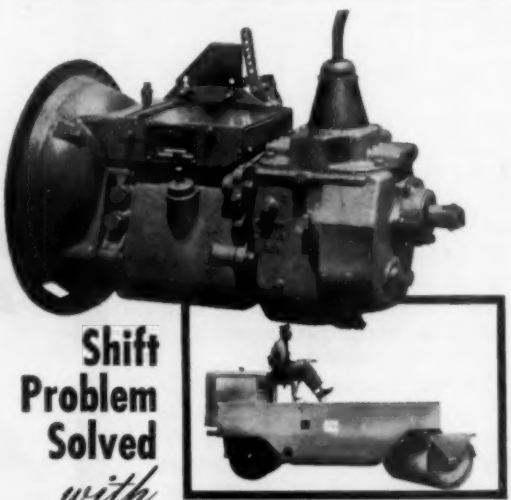

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of the same penetration grade. The usual things that a poor pavement are blamed for—poor quality control, lack of fines, moisture in the stone, the human factor, and lack of compaction—were eliminated one by one as variables. A quality control program was extended throughout the company's 35 plants and among its field employes. The problem of persistently soft pavements at out-in-the-sun temperatures (up to 140 to 150 degrees F) was finally narrowed down as being due to variability in some quality of the asphalt cement that didn't come under the standard tests (penetration, etc.)

Mr. Woodward in his slide illustrated talk showed the often-startling fluctuations in penetration values at temperatures higher than 77 deg. F. The company eventually developed its own Index of penetration, based on 104 deg. F., and developed a means of correlating the Marshall stability test in its program. Also modification was made in the standard ASTM float test to produce a closer correlation with the viscosity and cohesiveness of the material at field temperature conditions.

Refiners cooperated in this program. A much more uniform asphalt cement is supplied today. The company's H L R formula now stands for a product that must meet the firm's own Industrial Asphalt Index, float test and other standard tests.

This company's mix is designed with 40-50 pen. asphalt, since this grade is specified for streets in Los Angeles. While not using asphalts of other grades, the company did extend its testing to include samples of 60-70, 70-85 and 85-100 pen. grade. The same deficiencies were found in these samples, supplied from reference in various parts of the country, as existed with the 40-50 pen. materials.

While this company's conclusions are not considered as being fully applicable to problems in other areas, Woodward's paper nevertheless evoked much discussion. The complete paper is obtainable by writing to the National Bituminous Concrete Association, 1145 Nineteenth Street, N.W., Washington 6, D.C. or to Industrial Asphalt, Inc., 1100 S. Beverly Drive, Los Angeles 35, Calif.

Along the new scenic Canada 17 route which is expected to draw a heavy tourist traffic, the asphalt pavement is designed for rugged climatic conditions.

New 165-Mile Trans-Canada Highway Link Open

The Trans-Canada Highway 17, especially the newly completed 165-mile route in Ontario, has been lauded as an "engineering milestone" by H. Keith Griffith, Executive Director of the National Bituminous Concrete Association.

Mr. Griffith notes that the 4,470-mile asphalt-paved route will be, when finally completed, the world's longest continuous highway.

Of special interest is the new 165-mile section from the Agawa River, 95 miles north of Sault Ste. Marie, to Marathon. This scenic 24 ft. highway on a 150-ft. right-of-way has grades no steeper than 7 percent despite the hilly mountainous terrain.

The 165-mile segment required continuous heavy clearing, 11,000,000 cu. yd. of earth and rock grading, 25 bridges, and the paving took 500,000 tons of bituminous concrete.

Of the almost 3 million cubic yards of rock removed, the greatest area of removal was north for five miles from the Agawa River. As much as 70,000 cu. yd. of rock were taken from single cuts in this section. Several cuts are from 300 to 600 ft. long—and from 55 to 60 ft. deep. One side hill has a 75-ft. drilled face.

Of the 25 bridges which line the new highway, many are major structures. The Agawa River Bridge is 320 ft. long; the White Lake Narrows Bridge 455 ft. long; the Big Pic River Bridge 684 ft. long; and the Michipicoten River Bridge is 438 ft. in length. The latter structure cost $1,269,000. Bailey Bridges were used to speed work and to take the fullest possible advantage of work as it was done. At one stage, there were no less than ten Bailey Bridges in "The Gap."

The 165-mile link cost $40 million. The entire 1,453 mile Ontario portion of the Trans-Canada Highway will cost $214,000,000.

The new section closes one of the biggest "gaps" in the long-planned project. Its construction is an engineering saga, long to be remembered in the North country. The rugged, almost mountainous terrain, covered by dense forests, had few settlements en route. The only transportation for most of the route was by rail or boat. In the early stages, some survey crews and other personnel had to get to their working areas by boat.

THE USEFULNESS OF A LIMA MADSEN

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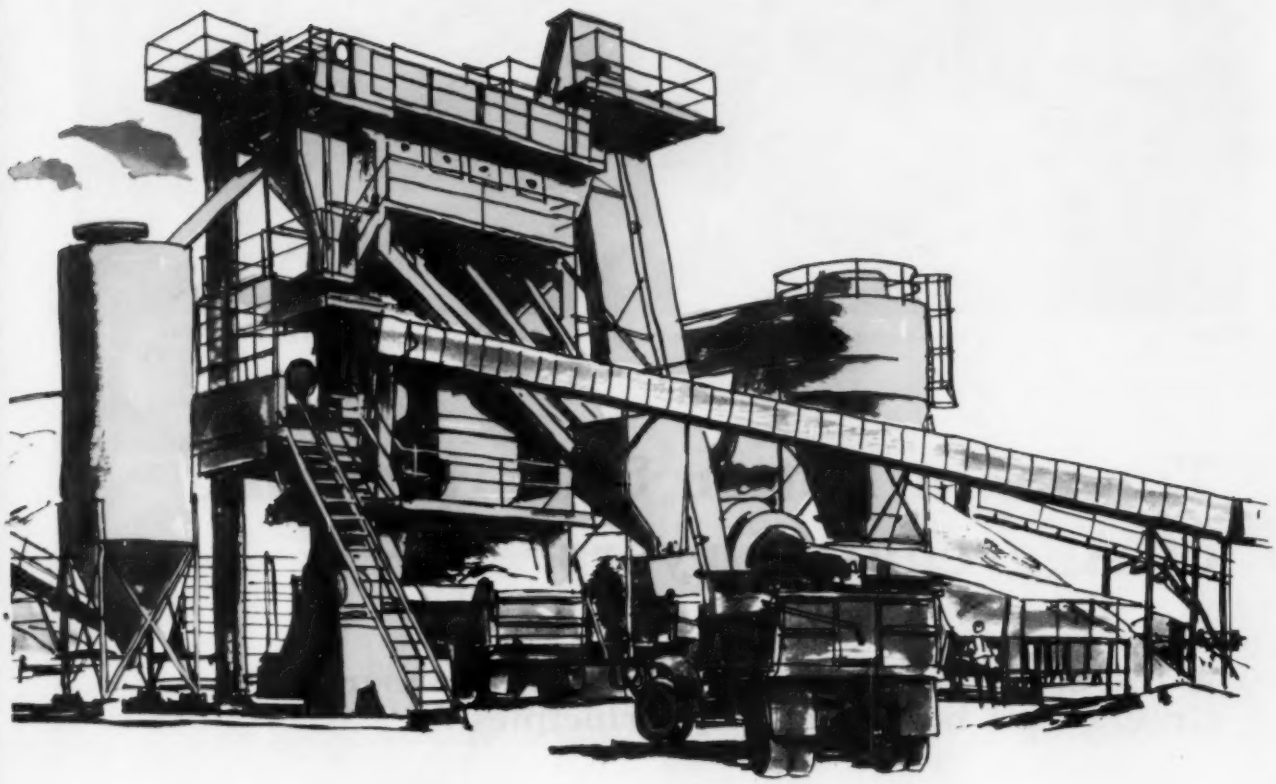

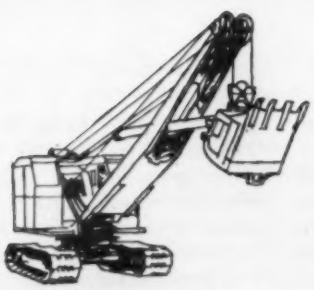

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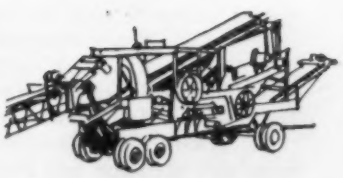

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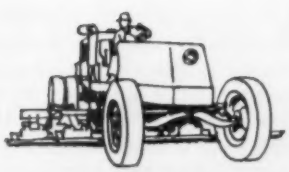

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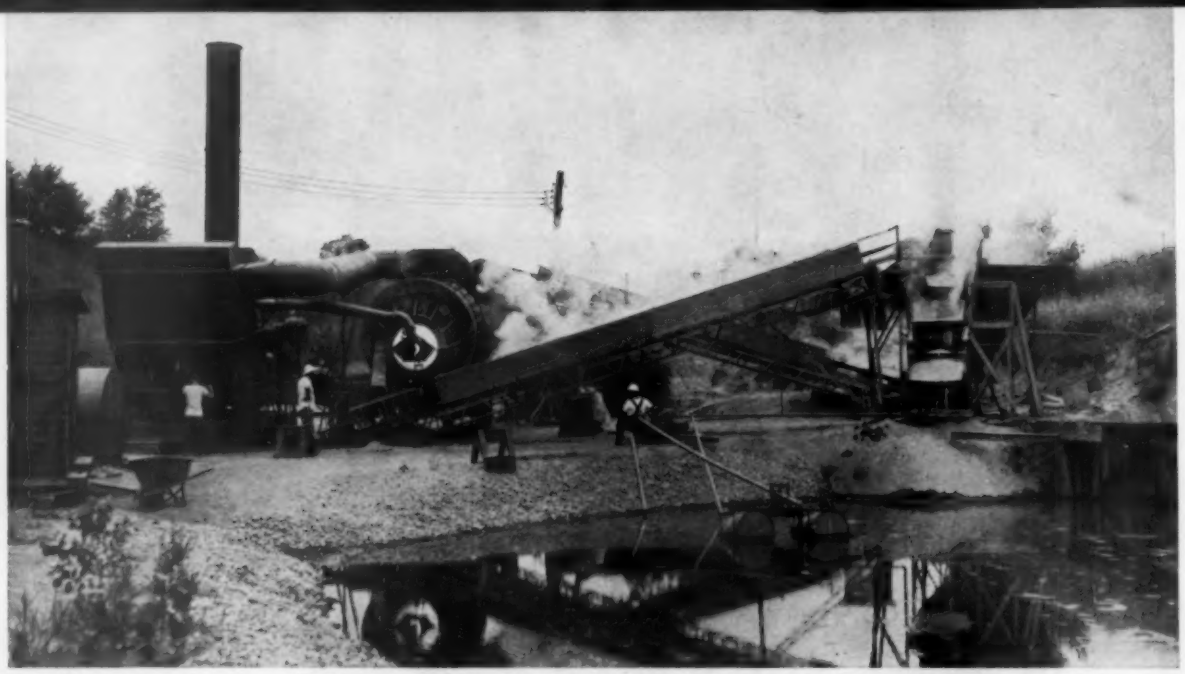

Visualizing the test program, this diagram shows how a complete plant was set up and check points determined.

Toward a Better Understanding of Aggregate Dryers

A full-scale dryer test program by Barber-Greene has helped clarify principles

An aggregate dryer appears to be a simple unit—just a revolving cylinder used as an oven to take the moisture out of aggregate materials while passing through. But the efficiency of a dryer, from a purely mechanical or heat-use standpoint, involves a good many variables. And so does the dryer's functional performance in drying the aggregates. Progress in understanding dryer principles has been hampered by the difficulty of obtaining reliable test data under the restrictive conditions of actual job operation.

With these circumstances in mind, Barber-Greene Company, manufacturer of bituminous and materials handling equipment, two years ago undertook a test program in which conditions affecting the testing and evaluation of dryer performance could be controlled.

This test program, continued through two full operating seasons, has yielded important clarifications. Some of the thinking that went into planning and execution of the test program, as well as some of the conclusions, are here reviewed.

As a background note, it is pointed out that a dryer along with its associated exhaust gas and dust collection equipment is a vital component of an asphalt plant. Very often it is the controlling element in securing top production; under given conditions, dryer operation is frequently the first bottleneck when stepped-up tonnage is desired. Yet, important as this unit is, surprisingly little factually has been known on the factors that affect dryer performance and selection. For this reason, certain factors are often over-emphasized and others neglected. Selling claims by various manufacturers have not always helped correct the distortions.

In undertaking a test program, Barber-Greene's engineers had available a great deal of practical data from owners of thousands of the firm's dryers. This information and experience were used as a starting point for setting up controlled plant conditions and selecting test objectives. Among the variables pinpointed were local aggregate characteristics, moisture content of the materials, production capacity rates, and operating techniques of indi-

vidual contractors. By setting up equipment solely for testing, the company could proceed without worry over hampering a contractor's production. Also the variables that might concern the designer would be more easily isolated and given comparative study. Laboratory test data thus obtained could be combined with practical experience of owners to arrive at improved knowledge that would benefit the entire industry.

The test program was designed with certain practical limitations in mind. The dryers in the test were operated at rates comparable with common job production, i.e., 100 to 300 tph. To economize on aggregates, the same materials were used and re-used via closed-circuit flow. While removal of surface moisture was the prime concern, problems of removing internal moisture were also studied. To obtain comparative data, several dryer sizes were included—7 and 9 ft. diameters and 20 and 30 ft. lengths.

The test objective, besides comparing performance of different units, was to evaluate mechanical design details that would be primarily of interest to the company's equipment designers.

During the two seasons 600 individual test runs were made and about 30,000 measurements and other items of data were recorded. The $175,000 program consumed 125,000 gal. of fuel oil, to mention a further statistic.

All components such as feeders, pumps and meters were calibrated prior to the test, and regularly rechecked, in order to hold constant each of three factors, selected to give a common base of reference against which all other variables could be measured and studied.

These three factors were (1) temperature, kept at 325 deg. F., plus or minus 10 deg.; (2) carbon monoxide present in the exhaust gas, kept at 0.5 present; (3) aggregate gradation, kept as constant as possible, using No. 4 minus material.

The factors known to be important in selecting and using a dryer, and which were either held constant or studied as a variable in the testing, include the following: tonnage rate, moisture content, air flow rate through dryer, fuel oil rate to burner, air flow rate to burner, drum slope, drum diameter, drum length, and lifting flight design.

Testing Technique

The testing technique developed for the project took in six steps:

1. Select the rate of aggregate feed, in tons per hour, and adjust belt feeder to deliver.

2. Adjust stack damper to provide desired air flow through the exhaust fan.

3. Set burner micro-valve for a predetermined flow of oil and atomizing air.

4. Add metered water to the hot, dry aggregate in the pugmill, in amounts that would stabilize the dry aggregate discharge temperature at 325 deg.

For the test purposes it was noted that the BTUs of heat input to the system (represented by gallons of fuel oil burned) equaled the heat required to evaporate the metered water into the system plus the heat lost through exhaust gas, radiation, etc. The metered water gallonage thus was a yardstick of the useful work done at the system's point of balance.

5. To determine best performance under given conditions, the metered water and fuel oil were then stepped up, in increments, until the exhaust gas flow turned jet black (indicating that the evaporative-combustion limit or thermal capacity limit had been passed.

6. Next, to verify results, selected tests were re-run with a resulting variation of less than 1 percent, as a validation of results.

Test Conclusions

The conclusions from this program emphasize the interlocking nature of the variable factors in dryer performance. The company emphasizes the danger of drawing conclusions in field operations by comparing data on only one factor, because other factors will undoubtedly distort the comparison.

1. Production capacity in relation to drum size. A basic conclusion was that for any one drum, with other factors held constant, an increase in burner and air flow resulted in an increase in production capacity—without any apparent stopping point. (A 7′ x 20′ drum normally operated with a 24,000 cfm exhaust and certain blower-burner combinations was progres-

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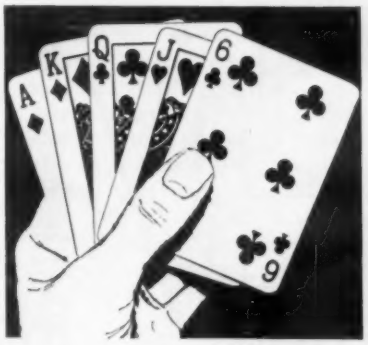

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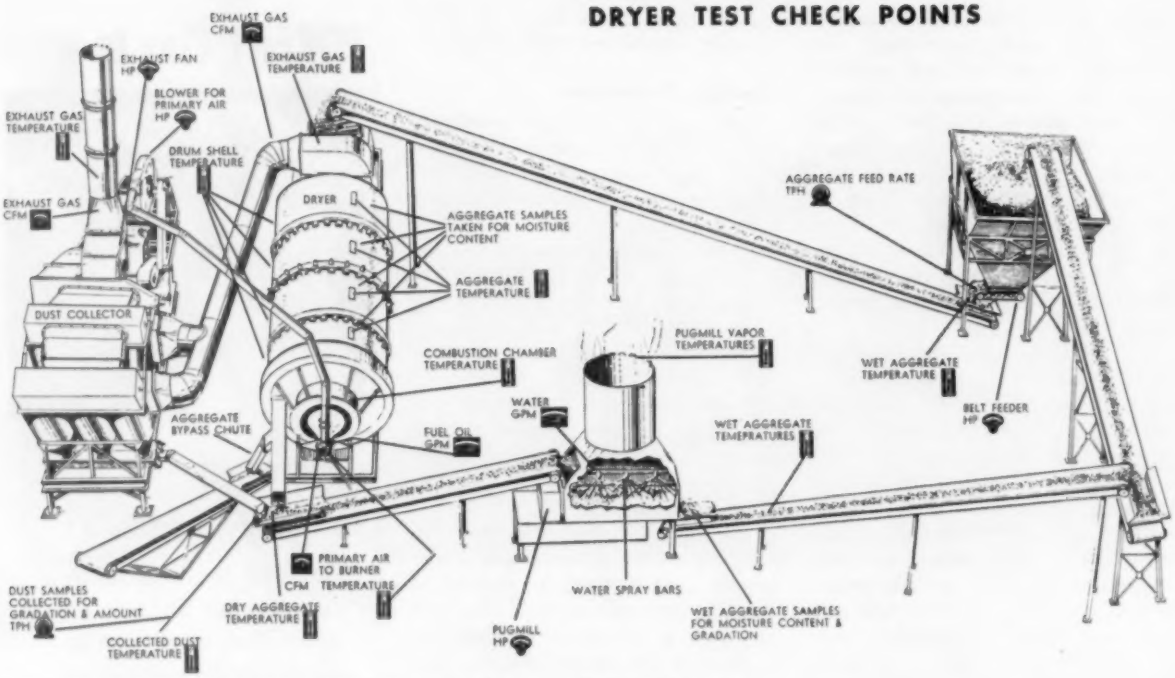

The test site seen during one of the tests run under controlled conditions.

sively tested with exhausts up to 44,000 cfm, with increased production at every step.

2. Turning to other possible limiting factors within good dryer design, temperatures on combustion chambers and on drum shells at the combustion end were checked. It was expected that these temperatures would be a limitation with greater heat concentration. But the cooling effect of the high-velocity air seemed to keep these temperatures below the critical point, although the life factor might be decreased (chambers and drum might burn out under improper operation or failure of exhaust or aggregate feed).

3. Heat transfer to the aggregate did not prove to be a limiting factor. Judging from straight production capacity alone, and with all other factors constant, more burner and more air generate more heat which can be absorbed and turned into effective work in the drum.

4. Air flow limitation. Dust carryout, a serious problem at too high gas velocities, was found to increase proportional to the square of the gas exhaust volume in a given drum. The researchers concluded that, because of the difficulty in deciding which gas velocity was correct for a given drum, comparisons should be based on the same gas velocity, rather than on the total volume of exhaust gas alone.

5. Diameter relationship. On dryers of the same length, with the same gas velocity and with other factors held constant, the maximum production capacity was found to

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vary in direct ratio to the cross-sectional area (or to the square of the diameter). This means that a dryer 50 percent bigger in cross-section will give 50 percent more production, if burner and air flow are proportionately increased.

6. Dryer length. Top production capacity was found to increase with added length, for a given diameter, but with less than a direct ratio. This suggests a diminishing gain from lengthening the drum alone.

7. An increase in drum gas velocity, also will yield diminishing returns. It permits an increase in maximum production capacity, but on a less than direct ratio.

8. Thermal efficiency was proved to be a constant if the dryer is properly balanced and operated—regardless of dryer diameter, length, drum gas velocity, etc. This is contrary to previous theories.

9. Other thermal efficiency observations, also contrary to field impressions:

Radiation heat loss through drum shell, with 15 mph wind, was only 2 to 3 percent—indicating doubtful need for multiple-shell design to conserve heat, and showing the need for drum shells to dissipate heat to prevent overheating.

Volume of stack gas and temperature of this gas, combined, determine the heat loss—not stack gas temperature only. Excess air beyond that needed to support combustion can lower stack temperatures, but also increase heat loss out of the stack.

10. A much higher portion of the heat transfer into the aggregates takes place through radiation than was formerly accepted. (Radiation is heat transmission by rays, as contrasted with convection via air or gas, or conduction via particle contact.) The role of radiation is shown by the fact that more heat transfer takes place in big-barreled, short dryers than in small-barreled, long ones. Barber-Greene introduced the concept of high-capacity "radiation-type" dryers over 15 years ago.

11. Increased dryer capacity is most apt to result from increased air volumes and larger burners to match. This fact is important, since as noted, combustion within the drum seems the primary limitation in getting maximum tonnage with a given size of dryer.

12. Flight design is less important than other design details in securing top production, assuming that the aggregates cascade properly so as to give an adequate veil performance. The main purpose for flights in the drum is to produce a veil of material in suspension to assist in heat transfer. Material is in suspension usually not over 3 to 5 percent of the time in conventional drums.

Flight design is important, since it has to do with the amount of the veil, and there is a point where too much veil will interfere with combustion more than it will help heat transfer.

13. Rate of flow of material through the dryer was studied, in relation to flight design, drum slope, rotating speed and other factors. It is noted that any degree of material concentration in the drum can be achieved within the drum's cubics, regardless of length or diameter, and that this is a key factor in particle retention time.

14. The length of time the average particle spends in the drum under given conditions has been a source of confusion. Increased retention time is important particularly with problems of internal moisture drying. Retention is usually calculated by taking the "dead load"—the amount of material in the dryer when feed and rotation are stopped—and dividing it by the tonnage output rate.

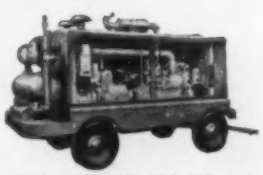
The conclusion here is that dead load should not exceed 16 percent of the total drum cubics. Too high a percent can lead to surging and erratic flow, giving uneven drying.

15. The internal moisture drying (primarily in the coarse aggregates) is helped by longer retention time. Longer retention time is a factor of drum cubics (both diameter and length), and it means reduced capacity in a given drum.

16. The research findings emphasized the effect of moisture content on dryer capacity. This effect is greater than generally realized. The accompanying figure shows the direct effect on tons per hour capacity as moisture content increases (assuming 60 deg. entering and 300 deg. exit temperature). Operators are cautioned to measure moisture content of aggregate accurately in comparing dryer performance. This content is often guessed.

Trenching 7 miles of street, this Jaeger "125" Roto ran two 80 lb. breakers to line-cut and break a 7" top of asphalt over brick — averaged 1200 sq. ft. per 8 hr. day—used only 1½ gals. of fuel per hr.

Jaeger "125" Rotary speeds street work



2-wheel: 75, 85, 125, 250 cfm
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NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*

International's Scout

New Vehicles Announced at Phoenix Proving Grounds

Two new vehicles, one a small all-purpose vehicle for passengers and cargo, and the other a light-duty truck that is offered in several body styles were unveiled at a January press conference held at their Phoenix proving grounds by International Harvester.

A vehicle designed for a low cost transportation of passengers and cargo can be quickly and easily converted from a completely enclosed passenger runabout, small pickup or panel truck to an open model without top, windows or doors. Because of its unique and versatile design the Scout, as it has been named, can provide efficient and economical transportation for a wide variety of uses. Functional design of this two-wheel/four-wheel drive model includes a three-person passenger compartment with removable steel top, 5 ft. long pickup body, fold-down windshield, removable door glass and removable drive model includes a three-perdoors. A full-length one-piece Travel-Top, that encloses driver compartment and body is optional.

A full-width 52 in. front seat provides 3 person passenger comfort. Additional seating is available on the two full-length wheel housings in the 5 ft. integral pickup body.

The IH built Commanche engine boasts a 152 cu. in., 4 cylinder valve-in-head powerplant. It will develop approximately 90 hp. at 4,400 rpm. The engine features five main bearings, water pump and fuel pump and filter that were originated in the V-304 eight cylinder truck engine. The 3 by 4 in. welded box frame is reinforced with 2 box crossmembers and two channel crossmembers. Ten in. clutches and 4.27 gear ratio and 12 volt electrical systems are all standard.

International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 101 on Enclosed Return Postal Card.

Light Duty Trucks

Another of a new line of vehicles recently announced by International Harvester is the C-line truck group. The line ranges from 4,200 to 8,800 lb. gross vehicle weight.

Standard and Bonus-Load pickup, panel, Travelall and Travelette models are offered, as are chassis with stake, platform, dump and service-utility bodies. The new Travelall seats nine persons or, with front seat, has a payload area of 124 cu. in. Conventional 2 wheel/4 wheel drive chassis are included in the C-line. International V-8 engines are standard for all models. Valve-in-head six cylinder engines with gasoline or liquified-petroleum-gas fuel systems are optional.

Other C-line advancements include new hydraulically-operated clutches in all models, a new exhaust system, new emergency brake and transmission controls and redesigned bodies.

The standard engine is rated at 155 hp. An optional, the V-304 V-8, a 193 hp. engine, or the 6 cylinder BD engines rated at 113 to 141 hp.

International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill

For more details circle 102 on Enclosed Return Postal Card.

Sign Material

A new highway signing material with permanently colored acrylic overlay in approved colors has been placed on the market by the Georgia-Pacific Corp.

Two exterior plywood panels have a tough double overlay. Developed for turnpike signs as well as for smaller street and highway signs, the new

Continued on page 158

International's new C-Line Equipment—Standard Power is the V-8 V-266 engine, 155 hp. Power brakes, steering are optional, as is automatic transmission and 4 wheel drive.

*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.

Illinois Route 125, west of Springfield. Texaco Asphalt pavement laid by P. H. Broughton and Sons.

Illinois Route 88 near Walnut. Paved with Texaco Asphalt by J. P. Hollerich Company. Note asphalt center island.

Illinois traffic flows smoothly over resilient, joint-free Asphalt

Here are three segments of the Illinois state highway system totaling 24 miles, which have the same type of pavement. Traffic on all three is served by hot-mix Texaco Asphaltic Concrete.

On these Illinois highways, as on the Massachusetts and Connecticut Turnpikes and Virginia's Richmond-Petersburg toll road, this resilient, rugged pavement demonstrates its ability to stand up under punishing impact with a minimum of maintenance. Thanks to its resilience and freedom from expansion joints, motorists enjoy its velvet smooth riding quality. Danger of accidents is reduced by the skid-resistant texture of hot-mix Texaco Asphaltic Concrete and by the sharp visibility of traffic lines on its dark, glare-free surface.

In addition to its other important advantages, hot-mix Texaco Asphaltic Concrete is speedily laid and requires no time consuming curing period. It is the ideal heavy-duty pavement for highways, streets and airports, particularly for the Interstate Highway System.

If you have a paving problem, our 55 years of Asphalt experience is at your service. Write our nearest office if you would like to discuss your problem with one of our field representatives. Mail the coupon below for helpful Asphalt paving literature.

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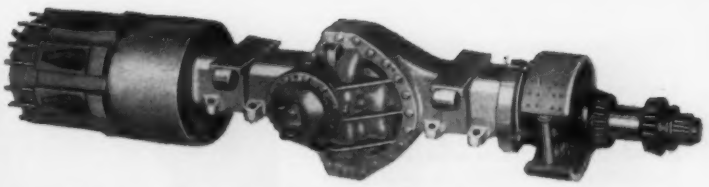
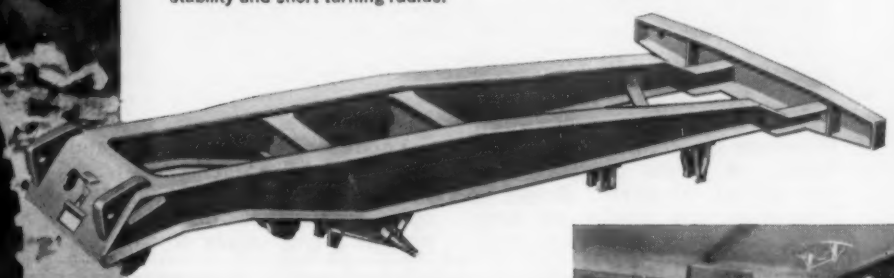


Heaviest-duty Mack rear axle, combining hypoid carrier with Planidrive®, keeps M-30X hustling where others bog down. The new M-30X boasts one of the strongest, longest-lived rear axles of any four-wheel dumper in the field. Drive is through exclusive single-reduction hypoid Mack carrier, with planetary gears in wheel hubs. Suspension is by extra long, extra broad semi-elliptic progressive-rate leaf springs with cam-faced slipper ends and radius rods.

New tubular front axle withstands heavier loadings. Steel tubing, seven inches in diameter, with walls ¾" thick is welded to cast ends to provide a reversed Elliott front axle that withstands the most punishing loads of quarrying, construction or mining. Extra wide tread gives maximum stability and short turning radius.



Five-crossmember, alloy steel frame shrugs off jarring drop loads of big shovels. Typical of Mack off-highway truck construction practices, the frame of the M-30X Model is extra solid, extra strong. I-beam main rails are tied together by five welded crossmembers to prevent stress concentrations.

New, massive functional cab for easier truck handling . . . extra driver comfort. The M-30X cab is not only rugged, but completely functional. Offset design provides maximum vision for quicker spotting and dumping and safer operation. Forward position permits heavier loading of new set-back front axle.

Meet the new Mack four-wheel dumper chassis that meets the most challenging, rigorous, heavy-duty jobs in mining, quarrying and construction—the M Model 30-Ton Dumper.

Visually, the silhouette of the new M-30X exhibits efficient, modern lines that are unmistakably Mack from the new, spacious and functional cab to a rear axle that is one of the sturdiest and most trouble-free of any four-wheel dumper in the field.

Beneath visual ruggedness lie the time-proved features that have won Mack construction trucks worldwide fame for complete reliability and performance. In addition, there are many M Model exclusives that make it even more maneuverable, rugged, dependable and safe.

Sure to be first choice among those who must haul huge tonnages profitably, the M Model is ready for your most critical appraisal. See your Mack branch or distributor for the full story of its capabilities. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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lightweight panels are being manufactured initially in green, white, red and blue to conform with most highway standards. The weight, stiffness and strength of Douglas fir plywood plus the advantages of easy workability with standard woodworking tools, are among the reported advantages of the new acrylic overlaid panels.

The material is being made in a wide variety of sizes and thickness, and there is a choice of acrylic on both sides or one side. It is available in widths of from 30 to 60 in. and in lengths of 72 to 120 in. with much larger sizes available in scarfed panels.

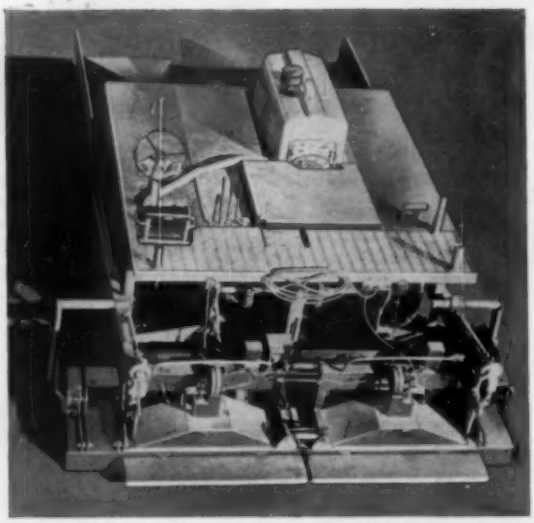
Georgia-Pacific Corp., Equitable Bldg., Portland 4, Ore.

For more details circle 103 on Enclosed Return Postal Card.

Bituminous Paver Finisher

A new "super" bituminous paver finisher has been introduced by Blaw-Knox Co.

Automatic level control available with the model PF-180 is believed to be one of the biggest improvements in bituminous pavers. This control helps rule out possible human error in maintaining material level ahead of screed, which eliminates overfeeding and underfeeding to permit constant pressure against the screed. Resulting compaction and density are more even. Conveyors are slat type with independent right and left control linked with right and left operation of the auger. Mercury level switches control the conveyor auger and are mounted ahead of the screed. In this position, they activate independent air clutches for right and left control of bituminous mix ahead of the screed.



Blaw-Knox Paver-Finisher, Automatic Level Control

Enlarged hopper capacity and hydraulic folding sides reduce truck waiting time, permit additional operation between truck loads, and provide a free, steady flow of material to conveyor. The new B-K paver—rubber-tired to improve traction and flotation—is equipped with a one piece, 10 ft. wide basic screed to eliminate center split and a hinge for crowning. This allows greater positive and negative crown ability without distortion of mat at centerline.

Blaw-Knox Co., Construction Equipment Div., Matton, Ill.

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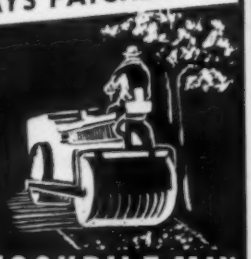

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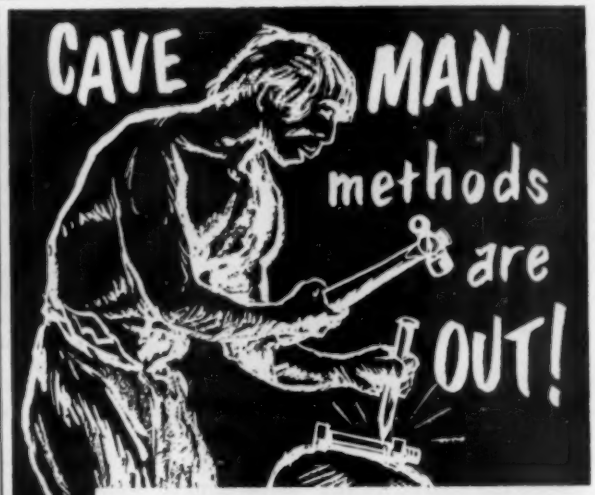

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...when some stuck together part threatens production. They won't take a chance on breaking the part with brute strength.

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As one customer said, **"Kroil loosens everything from an embalmer's needle to a bulldozer."**

Another wrote, **"Before trying Kroil on heat treat trolleys, we broke off every nut . . . since then we have not lost one."**

You, too, can get these results. Try Kroil on our make-good guarantee. Accept our combination offer, a gallon of Kroil, $4.35, and a Kroiler (squirt gun worth $1.50) for $5.25, F.O.B. Nashville. Order direct.

KANO LABORATORIES

1061 THOMPSON LANE • NASHVILLE, TENNESSEE

... for more details circle 344 on enclosed return postal card

42 Ton Tree Crusher

A new portable machine built for rapid clearing of reservoir areas, rights of way and forested plots was recently introduced to the market by R. G. LeTourneau, Inc.

The new machine, known as the G-40, permits more acreage per hour with fewer men and less equipment. The tree crusher is equipped with three electrically powered 6 ft. dia. steel rollers and weighs 42 tons. At a speed of three mph. the crusher rolls down trees at 5 acres per hr., reports the manufacturer. A 20 ft. wide push

LeTourneau Tree Crusher

bumper applies leverage over 10 ft. up on the tree to break the root system free of the ground. As the tree falls the blade studded rollers perform their devastating work, leaving a compressed matt of chopped trees and brush for in place burning. The unit is 39 ft. 10 in. in length, 20 ft. wide and 15 ft. high. Electric power for roller drive motors and power steering is supplied by a diesel engine driven LeTourneau AC generator and a DC generator. One single rheostat unit controls speed, power and braking while finger tip switch controls steering.

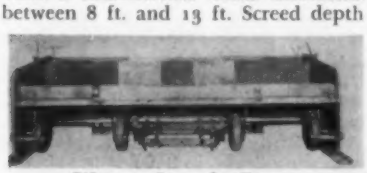
R. G. LeTourneau, Inc., 2399 S. MacArthur, Longview, Texas.

For more details circle 105 on Enclosed Return Postal Card.

Spreader-Paver

A new all-purpose road material spreader-paver is being engineered for applications of gravel and stone base by Warren Mfg. Co.

Model 813 GS, as it is known, provides a combination width dimension between 8 ft. and 13 ft. Screed depth



Warren Spreader-Paver

dimension for various materials is 0 to 12 in. The manufacturer states that it is engineered for applications of hot mix, cold mixes and stone gravel. Guide runners design permits radius equal to truck radius and leaves straight smooth edges.

Warren Mfg. Co., Box 413, Leffel Lane & Penn. R.R., Springfield, Ohio

For more details circle 106 on Enclosed Return Postal Card.

It's time you discovered

EIMCO TRACTOR LOADERS

IF YOU HAVEN'T ALREADY . . . check the performance, the quality, the advanced engineering of the best front end loader on the market today . . . anywhere in the world!

Sure, that's a strong statement, but it is backed by facts. No other manufacturer has the background of know-how that goes into every Eimco Loader, built by the company with greater experience building equipment for the roughest, toughest rock loading . . . with quality standards and working features no other machine of its type can begin to match.

Make us prove it! Get all the facts on the: Eimco 123 Loader The Eimco 105 Excavator The Eimco 126 Loader.

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. . . for more details circle 365 on enclosed return postal card

This Diamond T. Six-wheeler is a model 921DBN-SQHD, which has a GCW rating of 78,000 lbs. It is built as a "B" model with the front axle set well back for maximum front axle loading, as well as an "F" model with set-forward front axle for top legal loads where the bridge formula applies. Shown here, it is hauling an Allis-Chalmers 260 Motor Scraper.

Diamond T. Motor Truck Company, 4401 W. 26th St., Chicago 23, Ill.

For more details circle 107 on Enclosed Return Postal Card.

New 25 Ton Moto-Crane

A new 25 ton Lorain Moto-Crane, Model MC-325 was recently announced by the Thew Shovel Co. This is the latest addition to the Lorain line of rubber tire cranes that range from 7 to 80 ton lifting capacity.

The new "full circle" visibility cab has a "flip top" roof design, providing walk around accessibility. Power-set outriggers, as standard equipment can be set from travel to working position. A Lorain Shearball turntable connection supports and rotates the turntable

Lorain 25 Ton Moto-Crane

on a full circle of steel balls and eliminates adjustment, maintenance and lubrication. The MC-325 carrier frame is of all-welded box sections, has heavy duty hydraulic-assist steering, with air brakes on all six wheels. Two tandem driven rear axles with high traction differentials, mounted on equalizer beams provides 15 speeds forward. There are three speeds reverse. Wheelbase is 195 in.

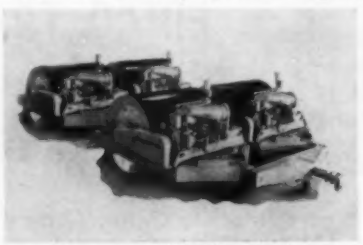
Thew Shovel Co., Lorain, Ohio.

For more details circle 108 on Enclosed Return Postal Card.

New Vibrating Roller

A new Ferguson Model 65 Vibrating Roller was recently announced by the Shovel Supply Co. This unit has a drum 5 ft. in dia., 6 ft. long and is equipped with 60 hp. Deutz air-cooled diesel engine.

The large eccentric shaft, driven by "V" belts, revolves at 2300 rpm. producing ample impact. The drum and vibrating mechanism is insulated from the frame and engine by large rubber "donuts", especially designed for long wear. To further project the engine,



Ferguson Vibrating Roller

it is mounted on rubber insulators. One feature of this design is that the bearings and moving parts run in a continuous oil bath, thus eliminating lubrication troubles usually encountered with vibrating rollers. The single drum unit weighs 11,000 lb. A four page color pamphlet giving specifications and illustrations is also available.

Shovel Supply Co., Dallas, Texas.

For more details circle 109 on Enclosed Return Postal Card.

Hydraulic Oil

A custom-engineered hydraulic oil designed to help insure peak performance from hydraulic systems even under extreme operating conditions, has been developed and is now being marketed by Lubrication Engineers, Inc.

The product—LE Brand Hydraulic Oil—is designed especially for hydraulic applications and possesses three important characteristics which contribute to overall better system operation. According to the firm's research-engineering division, these are: maintenance; film strength; and high resistance.

Since LE Brand hydraulic oil has naturally high viscosity index, states the maker, the product will not thin out at high temperatures nor thicken at low temperatures. This viscosity stability, LE officials explain, helps prevent "mid-day fade" or the loss of power and efficiency which occurs when operating temperatures climb upward during the afternoon.

Lubrication Engineers, Inc., P.O. Box 7128, Ft. Worth 11, Texas.

For more details circle 110 on Enclosed Return Postal Card.

35 Ton Industrial Crane

A new rubber-tired, self-propelled, 35 ton utility crane has just been an-

Link-Belt's 35 Ton Crane

nounced by Link-Belt Speeder Corp. Both the carrier and the upper are completely designed and manufactured by the company. Because of its one man operation and rubber-tired mobility, the UC-98A is said to be suited for industrial yard operations, and construction, or any application demanding short moves to scattered locations.

The upper, basically the same as on other "98" series models, features complete independency of all machine functions since the design provides a separate power flow for each. Other standard and optional features of the upper are Speed-O-Matic power hydraulic controls, power load-lowering clutches for either or both main drums, independent-swing-and-travel, third operating drum, independent high-low speed boomhoist with clutches for power up and down, safety boomhoist lever kick-out device, counterweight removal by gantry method, interchangeable, self-adjusting clutches and gasoline or diesel engines with hydraulic couplings or torque converters.

Link-Belt Speeder Corp., Cedar Rapids, Iowa.

For more details circle 111 on Enclosed Return Postal Card.

Continued on page 164

SEE A 2-WAY RADIO DEMONSTRATION

Your Motorola man will show you a nearby system in action

You'll see how radio-equipped construction vehicles and crews get *more production* out of men, minutes and machines—by coordinating operations on the site and between sites—eliminating confusion and waste motion.

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You'll see proof that Motorola 2-way radio can pay for itself in a short time—then go on to build profits—and give you a definite competitive edge on both *time* and *cost* estimates when a job is up for bids.

You'll get the full story from the man who owns the system. Ask him about Motorola dependability—Motorola service.

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New Hinged Road Fabric from Pittsburgh Steel folds in slightly more than half the fabric's full width. Here in Glens Falls, N.Y., where Torrington Construction Co. of Connecticut is building a 14-mile strip of the $275-million Northway, Job Superintendent Patrick J. DiNatale shows how new fabric folds along hinge running length of the sheet.

Pittsburgh Steel's New Hinged Road Fabric Big Success On New York State's Northway

Contractor Saves About One-Third Installation Time

Ready to go at Pittsburgh Steel's Monessen, Pa., plant is a flat-bed truck loaded with new Hinged Road Fabric. Ordinary road fabric requires special cradling equipment and extra handling. Not so with Pittsburgh Steel's new Hinged Road Fabric: it's shipped folded flat and in weights up to 40,000 pounds per truck (depending on size and style), twice that of ordinary fabric. Shipments to Glens Falls took only a day.

A revolutionary new road fabric from Pittsburgh Steel Company simplifies shipping, speeds handling and cuts installation time on roadbuilding jobs by as much as one third.

The new product, called Hinged Road Fabric, provides the steel backbone for a 14-mile strip of New York State's gigantic, $275-million Northway linking Albany with Canada.

Hinged Road Fabric features an off-center hinge running lengthwise on each section. Roadbuilders using this product—one of several being introduced by Pittsburgh Steel—cite its built-in benefits during:

• **Shipping**—Because Hinged Road Fabric's novel hinge permits folding in slightly more than half the fabric's full width, it can be stacked easily within the eight-foot width limit of a truck bed or gondola. This makes special cradle trucks and cradling equipment unnecessary.

As a result, trucks can be loaded to capacity (subject to state weight restrictions)—up to twice the weight possible with ordinary fabric.

• **Handling**—A single section of Pittsburgh Steel Hinged Road Fabric can be handled easily by two men instead of the four usually required for unwieldy ordinary sheets.

• **Installing**—Because the sheet is not bent during shipping and stacking, new Hinged Road Fabric lies flat when installed.

At Glens Falls, N.Y., where 800 tons of Hinged Road Fabric were installed on the four-lane, 175-mile Northway, Torrington Construction Co.'s veteran roadbuilders added their stamp of approval.

Patrick J. DiNatale, the Connecticut firm's job superintendent, was especially enthusiastic about the one-day service on Hinged Road Fabric truck shipments from Pittsburgh Steel's Monessen, Pa., plant.

"We get terrific service from Pittsburgh Steel," said Mr. DiNatale. "It takes just one day for a shipment to get here.

"Ordinary fabric usually takes a week to ten days to arrive because it's handled by truck, rail and then truck again. That's because many counties and cities won't permit trucks with overhanging loads to pass through.

"Pittsburgh Steel's fabric is handled only once—and in one day in loads up to 40,000 pounds, not 20,000."

Torrington's field engineer, Robert B. Cunningham, is enthusiastic about Hinged Road Fabric's fast, easy handling. He said:

"I estimate that at the end of a working day this Pittsburgh Steel fabric saves us about one-third the installation time required with ordinary fabric."

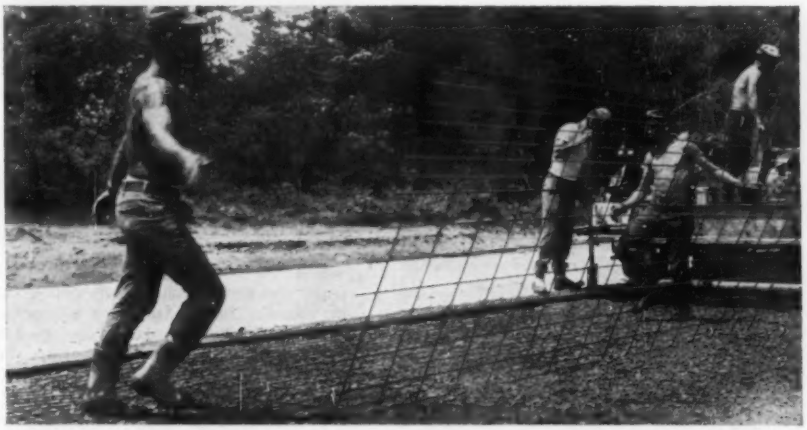
The man directly in charge of the fabric's installation—Paving Foreman John Picciocca who has worked with all brands of road fabric for the last 12 years—had this to say:

"What really sold me on Hinged Road Fabric is that it doesn't poke through the concrete while it's taking a set. That's a big problem with ordinary fabric. When that happens, you either have to cut the wire or repave the spot to cover the wire. That's murder on costs."

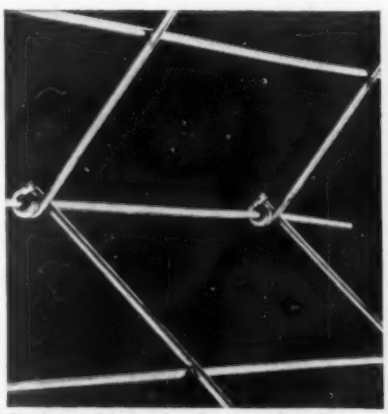
If you're in the roadbuilding business, you'll be dollars ahead—like Torrington—when you let Hinged Road Fabric provide fast, economical reinforcement on your next job.

Contact your nearest Pittsburgh Steel Products sales office listed here.

On the job in Glens Falls, N.Y., a section of Hinged Road Fabric is handled easily and quickly by just two men.



Down goes Hinged Road Fabric in just seconds—and as flat as a living room rug.



Unique hinge is the result of two years' development work.

Hinged Road Fabric

Patents applied for

Pittsburgh Steel Products

a division of Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta, Chicago, Cleveland, Dayton, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Tulsa, Warren, Ohio

Steel

... for more details circle 312 on enclosed return postal card

New Products

Continued from page 160

Four-Wheel Drive Frontloader

Following the introduction of the 4 wheel drive Frontloader 65A, Merton Engineering has now announced a further new model, the Merton Frontloader 80A.

The new machine is powered by a Ford 590E 6 cylinder diesel engine which develops 80 hp. at 1850 rpm. A single stage 3:1 stall ratio hydraulic torque converter and full power-shift epicyclic gear train transmit the drive

Merton's 4 Wheel Drive Loader

to the driving axles which have a four pinion differential, crown and pinion spiral bevel primary reduction and final planetary reduction at the hubs. Steering is power-assisted to the rear wheels. All hydraulic rams are double acting and are controlled through a valve which has detent positions to five semi-automatic raise.

The mobile load-lifting capacity is 4,000 lb. and the maximum crowd or pry-out force is 10,000 lb.

Merton Engineering Co., Ltd., Faggs Rd., Faltham, Middlesex, England.

For more details circle 112 on Enclosed Return Postal Card.

Mobile Aggregate Plant

A new large and highly mobile aggregate plant has been announced by the Ross Porta-Plant Co. It is known as the Ross 60-7.

The new plant incorporates a 7 yd. weigh batch bin into a 60 ton portable overhead plant. It is designed to in-

Ross' 7 Yd. Porta-Plant

crease the 60 ton overhead storage to 105 tons by the addition of a bin extension. The 60-7 plant has all the features of a stationary plant plus the additional advantage of high mobility. Easy to transport, the Ross plant can be erected in approximately 4 hr. after arrival at the job site, reports Ross. The plant is said to be the answer to the question of a 7 yd. weigh batch bin plant to accommodate the 7 yd. truck mixers that have become the industry's minimum standard. Featured in the design is a belt feeder running the length of the weigh batch bin. This system empties the bin onto an individual conveyor. The plant's capacity is 100 yd. of concrete an hour with proper allied equipment.

Ross Porta-Plant Co., Box 446, Brownwood, Texas.

For more details circle 113 on Enclosed Return Postal Card.

Submersible Pump

Full production of its new submersible dewatering pump was announced by the Gorman-Rupp Co.

Model 3VSI is a 3 in. centrifigal powered by a 5 hp., 3450 rpm., 60 cycle electric motor, and is available in three voltage selections: single phase, 230 volt; three phase, 220 volt; or three phase, 440 volt. Remote control box with overload protection and 75 ft. of heavy duty electrical cable are standard equipment with each pump. Complete unit weighs just 128 lb.; the pump weighs 95 lb. The capacity range is 10 gpm at 120 ft. of head to 300 gpm at 10 ft. of head. Design places motor and seal in separate, oil-filled areas of pump housing. Pump may run in complete safety, unattended, even if the hole runs dry, states the manufacturer. Motor, seal and bearings run in oil and require no lubrication of daily maintenance. Oil

BRAND NEW!

CONTRACTOR'S PORTABLE PUMP

Now Lowest Price Ever!

AMCO Self-priming, Portable CONTRACTOR'S PUMP, Model 242-G, with 2½ h.p. Briggs & Stratton Engine — 1¼" intake and discharge

Only $87.25 Complete

Cash Discount 5%

Pump Guarantee . . . TWO FULL YEARS • Engine Guarantee . . . Briggs & Stratton Standard Factory Warranty • Weighs only 39 lbs. . . . Easy to carry anywhere • Rugged! Self-priming! • Fits in smallest spaces! • Capacity 5300 gallons per hour . . . Lifts water up to 45' • Connects to any pipe or hose • Positive water-tight construction.

HEAD	10 ft.	20 ft.	30 ft.
GPH	5300	4380	3280

PAYS FOR ITSELF! This low-priced, all-around Contractor's Portable Pump will pay for itself over and over. It's a compact, rugged self-primer with hundreds of uses — from watering lawns to draining swimming pools. It gives excellent stand-by protection against flood waters, and its light weight makes it easy to carry from place to place. You'll find practical use for it, day after day.

DEPENDABLE, EFFICIENT! From its easy-running, long-lasting 2½ h.p. Briggs & Stratton engine to its mechanical seal for positive water tight construction, this pump is built for performance! Prime it once and forget it. It lifts water to a height of 45 feet. Its rated capacity is 5300 gallons per hour. And it can be connected to ANY pipe or hose!

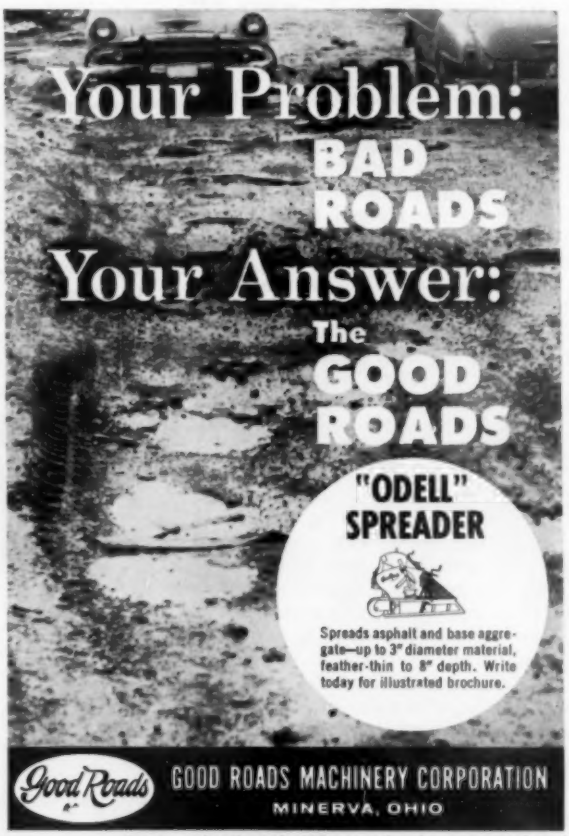
SAVE MONEY — ORDER DIRECT. Direct-from-factory purchase saves you real money! Our low, LOW price is only $87.25 anywhere in the U.S.A. 5% discount for cash. Open account to rated firms.

Order Today and Avoid Disappointment, Write, Wire, Phone!

AMERICAN MACHINE & TOOL CO., INC.

ROYERSFORD 32, PENNSYLVANIA Telephone: WIlliams 8-9010

. . . for more details circle 368 on enclosed return postal card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BAD ROADS
Your Answer:
The GOOD ROADS
"ODELL" SPREADER
Spreads asphalt and base aggregate—up to 3" diameter material, feather-thin to 8" depth. Write today for illustrated brochure.
Good Roads
GOOD ROADS MACHINERY CORPORATION
MINERVA, OHIO

. . . for more details circle 322 on enclosed return postal card

Gorman-Rupp Submersible Pump

immersion of motor provides built-in protection against overheating and climatic and environmental changes, reports Gorman-Rupp.

Gorman-Rupp Co., Mansfield, Ohio.

For more details circle 114 on Enclosed Return Postal Card.

Dryer-Dust Collector Combination

A new and expanded line of Dryerpacs, dryer-dust collector combinations, which includes 27 capacity ranges, in both portable and stationary models, has been announced by Barber-Greene.

The new combinations feature drum diameters and lengths from 5 by 20 ft. to 9 by 30 ft., three to twelve cone

B-G's DC-65 Dryer

dust collectors, and air flow capacities from 12,500 to 54,000 cu. ft. per min. Each Dryerpac is available with chamber of options, including three different drum air flow capacities to meet the needs of preferences of every asphalt plant owner regardless of make or model. Capacity ranges are available in small increments to beyond 350 tons per hr. The new device features: cradle chain drive; self-adjusting seals; power driven clog-free rotary inlet chute; and, cupped flight design.

Barber-Greene, Aurora, Ill.

For more details circle 115 on Enclosed Return Postal Card.

End Dump Trailers

Production of a new 10-12 yd. end dump trailer for on-or-off highway service has been announced by Omaha Standard, Inc. A torque arm cantilever spring causes both suspension springs to work in unison, thus the trailer will not twist with weight shifts.

The stability of the undercarriage permits use of an oscillating upper 5th wheel plate, thus the action from tractor to trailer resembles a universal joint—advantageous when dumping on uneven terrain. Tractor and trailer axles may be off parallel, yet dumping stability is governed only by the altitude of the trailer. The oscillating upper 5th wheel plate relieves any strain or stress from trailer and tractor. Extreme ruggedness, with the least possible weight, is provided by a formed sheet frame and interlaced sub-floor construction. A 50 deg. dumping angle is provided by a 20 ton four-stage cyl-

Omaha's End Dump

inder with a 140 in. stroke, allowing the hoist to work from the extreme front of the trailer the point of best leverage. A positive cam-type tailgate latch prevents accidental tripping.

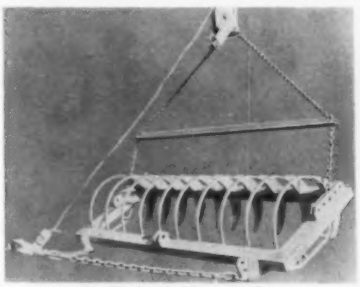
Omaha Standard Inc., 2401 W. Broadway, Council Bluffs, Iowa.

For more details circle 116 on Enclosed Return Postal Card.

Dragline Type Rake

A new product designed to replace a dragline bucket for certain types of work has been announced by the Insley Mfg. Corp.

The new product called the Basket Rake, has special design features for removing vegetation such as brush, weeds, roots and vines from irrigation ditches, drainage ditches, lakes and the like. Since the Basket Rake can be cast beyond the boom point like a dragline bucket, many ditches can be cleaned with the machine operating on just one side of the ditch. A feature in addition to the extra wide 9 ft. cleaning width is deep tooth penetration for tearing out and removing roots and roll-feed loading. The design of the rake makes it easy for the operator to maintain the original grade



Insley's Basket Rake

level. A basket rake with a 9 ft. cleaning width weighs 1,500 lb. and can be handled by a ½ cu. yd. machine.

Insley Mfg. Corp., Box 167, Indianapolis 6, Ind.

For more details circle 117 on Enclosed Return Postal Card.

Save TIME and DOLLARS with
"INSTANT 2-WAY RADIO CONTACT"

Talk and Listen Instantly to Your Men "On the Job"

New 2-way radio actually fits into your pocket. Exclusive, rechargeable battery lasts year or more. Range—½ to 1 mile. No license required.

GLOBE ELECTRONICS
Pocketphone
THE FINEST 2-WAY RADIO AVAILABLE TODAY

Ideal for office, factory, stores, surveying, construction, sports, recreation, home. Finest quality available. Makes handy paging system. Use with Globe Electronics CB-100A or CB-200 for longer range systems.
• Actual size — 1⅝" x 2⅜" x 6¼" • Weight – 13 oz. • High impact Cycolac case • All Transistorized. $125.00 each

FOR LONGER RANGE COMMUNICATION

CITIZENS BROADCASTER CB-100A . . . Complete 3-channel, 2-way station. Fixed or mobile installation. Easy to install, operate. Range 5-15 miles. $139.95 each

BROADCASTER DELUXE CB-200 . . . A rugged transceiver for commercial use. Transmits on 5 channels. Receives on all 22. Adapts to selective calling system. $189.95 each

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A Division of Textron Electronics, Inc.
22-30 So. 34th St., Council Bluffs, Iowa
Please send me complete information on the new Globe Electronics ☐ Pocketphone ☐ CB-100A ☐ CB-200

RS-3

NAME _____
ADDRESS _____
CITY _____ STATE _____

. . . for more details circle 324 on enclosed return postal card

Deep Curbs By Machine

A new automatic curbing machine, Model 700, has been developed, which lays deep curbs without the use of forms and with a minimum of hand finishing. The new "High Curber" lays Portland Cement concrete or asphalt curbs from 12 and up to 24 in. in height.

The new machine has two or more compaction augers. No forms are necessary as the curb assumes the final form as it is extruded from the machine. It uses a relatively dry or stiff concrete mix at zero slump. The sides of the curb can be vertical. In addition to forming the typical deep curbs, the machine can be used to extrude

Power's High Curber

concrete crash barriers as wide as 18 in. on the base. Speed of the machine is 3 to 5 ft. per min. depending on the size of the curb. In order to insure true grade and line of the finished product, when it is laid on a rough sub-base a simple-to-lay angle iron is used.

Adjustments in the machine allow it to negotiate contours, move up or down grade, and turn radii down to 12 ft. It is powered by a Wisconsin Model AGND Engine developing 12.2 hp. at 3200 rpm.

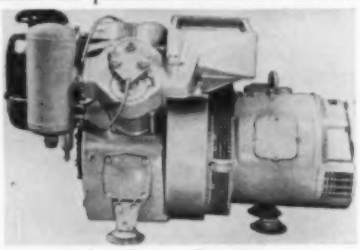
Power Curbers, Inc., Salisbury, N.C.

For more details circle 118 on Enclosed Return Postal Card.

New Compressor Announced

Market introduction of a new 30 hp. air compressor delivering 141 cu. ft. of air per min. was reported by Atlas Copco.

The manufacturer said that this machine is designed for heavy duty, three shift operations in construction jobs, mines and plants. Foot mounted on bonded rubber, this compressor is ideal for permanent installations and



Atlas Copco Compressor

on temporary job sites, offering all the advantages of a heavy duty machine while retaining the flexibility of a portable compressor. Designated the TT6, the new machine is a two-stage, single acting unit featuring total air cooling.

The TT6 has an outstanding capacity to weight ratio, obtained by the use of light weight metal alloys for many parts, including crankcase covers, pistons and valve retainers.

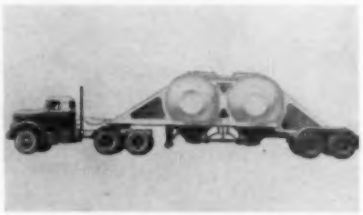
Atlas Copco, Inc., 545 Fifth Ave., New York 17, N.Y.

For more details circle 119 on Enclosed Return Postal Card.

Dry-Bulk Transport

This newly-introduced Highway-Interconsult dry-bulk transporter uses an advanced and highly efficient pneumatic unloading system to discharge cement and sand at the rate of five to eight barrels per min.

Pneumatic discharge system incorporates a patented injection and can be regulated easily. It is designed to prevent damaging flow-back. Absence of augers, screws, vibrators and other mechanical components, plus low engine speed (2700 rpm) and compressor speed (1350 rpm) combine to re-



Dry-bulk Transport

duce noise-levels during unloading. Completely pneumatic and gravity unloading with relatively slow engine and compressor speeds also reduces maintenance and provides low operating costs. Spherical chambers are available in 300, 340 and 400 cu. ft. sizes, making possible transporter capacities up to 80,500 lb.

Highway Trailer Industries, Inc., New York 17, N. Y.

For more details circle 120 on Enclosed Return Postal Card.

95 Ton Payload Truck

Built as a tractor trailer combination, this new KW-Dart truck uses dual tires on the rear wheels of the tractor and trailer. The frame is made up of heat treated pressed steel channels bolted back to back in pairs to form an I beam. The new truck is powered by a V-12 diesel engine rated at 700 hp. An 1850 series drive line transmits power to the KW-Dart 140-S triple reduction planetary drive axle. The ten tires have a total capacity of 300,500 lb. The vehicle tractor-trailer and body has a combined unladen weight of 120,000 lb., thus permitting a payload of 190,000 lb.

KW-Dart Truck Co., Kansas City, Mo.

For more details circle 121 on Enclosed Return Postal Card.

New Turn Signal

A new turn signal has been intro-

Continued on page 169

T-33

Pavement Sealer

(the contractors approved sealer)

Increased facilities make possibility the addition of other Distributor and Dealer outlets for T-33 pavement Sealer.
To those interested in handling and applying a high quality sealer that will add future customer prestige and confidence, your inquiries will be given our immediate attention. We are interested in contractors ONLY whose major concern is with customer satisfaction.

For information circle no. 366 on card or write Sales Manager, Box 4423 Tri-Village Station, Columbus 12, O.

KW's 700 hp. 190,000 lb. Payload Tractor-Trailer

a new program

for progressive improvement of secondary roads

This hard, firm unpaved road will eventually serve as a base for paving. Columbia Calcium Chloride keeps its surface stable, pays its way with reduced aggregate and blading costs.

QUESTION: How can you establish a stable, dustless surface for roads that merit it, when your yearly budget allows for paving on only a small portion of these roads?

ANSWER: A balanced program for roads utilizing the proved benefits and economy of Columbia Calcium Chloride for *Stage Construction and Improved Maintenance Standards.*

STAGE CONSTRUCTION PROGRAM consists of:

1. Improving width, alignment and drainage.

2. Placing the initial course of Columbia Calcium Chloride stabilized aggregate wearing surface. Columbia Calcium Chloride is used in this surface to hold fines moist and tie down stone. In some cases, traffic may use this surface for several years.

3. Adding the compact, dense-graded aggregate base course in sufficient thickness and gradation to support projected traffic. To insure uniform moisture for material stability, Columbia Calcium Chloride should be mixed with the base material or applied to the surface.

4. Paving as funds become available *in the future.* Usually little additional base work need be done. The base is stable with good grade which helps insure a successful paving job.

IMPROVED MAINTENANCE STANDARDS include:

1. The elimination of dust as a hazard, waste and inconvenience.

2. The ability to keep more roads well graded.

3. Future paved surface will be better because of more stable base. The use of Columbia Calcium Chloride is the soundest procedure for meeting the basic needs of a progressive improvement program.

Get complete information about a balanced program of secondary road improvement and how Columbia Calcium Chloride benefits both the road official and the road user. Write today for your free copy of this illustrated bulletin.

columbia | southern chemicals
CHEMICAL DIVISION
PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA
DISTRICT OFFICES: Boston · Charlotte · Chicago · Cincinnati · Cleveland Dallas · Houston · Minneapolis · New Orleans · New York · Philadelphia Pittsburgh · San Francisco · St. Louis · IN CANADA: Standard Chemical Limited

Columbia Calcium Chloride
One Gateway Center
Pittsburgh 22, Pa.

Please send me a copy of "A Program for PROGRESSIVE IMPROVEMENT of Secondary Roads."

Name _____

Title _____

Organization _____

Address _____

City _____ Zone ___ State _____

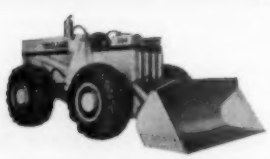
... for more details circle 290 on enclosed return postal card

How To Effectively Key Your Bidding And Buying!

Making a successful bid and coming up with an adequate profit is a rare art in these times, but *it can be done* if machine capabilities and job requirements can be closely and accurately matched . . . TROJAN gives you the opportunity to make the most of your own experience and judgment in matching job and machine for maximum profit . . . With 7 machines available in lifting capacities of 7,000 to 24,000 lbs., with bucket options, power options and attachment options; you can key bucket capacity to required power with almost pin-point accuracy . . . There's no need to compromise — no need to buy more or less work capacity than you actually need . . . And, in addition, with every TROJAN you get the tested and proven features of design and construction that permit your operator to tackle the toughest jobs hour after hour, day after day — and complete them safely, swiftly and profitably . . . Most TROJANS sell themselves to hard-boiled buyers at competitive demonstrations against any machine on the market because they are built right, priced right and are 'honeys' to handle . . . Want more details or a field demonstration? Just call your nearest Trojan distributor.

AD NO. 44-27

MODEL 404
LIFTING CAPACITY 24,000 LBS.



MODEL 304
LIFTING CAPACITY 18,000 LBS.

MODEL 254
LIFTING CAPACITY 15,000 LBS.

MODEL 204
LIFTING CAPACITY 12,000 LBS.

MODEL 164
LIFTING CAPACITY 10,000 LBS.

MODEL 134
LIFTING CAPACITY 8,000 LBS.

MODEL 114
LIFTING CAPACITY 7,000 LBS.

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION • BATAVIA, NEW YORK

. . . for more details circle 363 on enclosed return postal card

New Products

Continued from page 166

duced to the market by the R. E. Dietz Co.

Optically designed to meet 1960 S.A.E. photometric requirements, the new acrylic fade-proof lens delivers maximum working optics from the center of the lens to the edges. Available in chrome or aluminum finishes, the two single face models and two

Dietz Turn Signals

double face models are identical except that the single face units are fitted with opaque plastic rear lenses. Lightweight, the light's watertight "O" ring lens gasket eliminates the use of screws or retainers. Brass bulb socket and zinc diecast body are non-corrosive and completely rust-proof. As required by some states, the double face turn signal model incorporates a baffle plate to prohibit sunlight "shine-through" on the lense.

R. E. Dietz, 225 Wilkinson St., Syracuse 1, N.Y.

For more details circle 122 on Enclosed Return Postal Card.

5 Ton Compact Crane-Excavator

Power crane and shovel manufacturer Schield Bantam Co., has announced the introduction of its all new Compact Model 250 Bantam.

The compact 250 Bantam is a departure from standard cable-operated power crane-excavators and all-hydraulic machines in that it features both cable and hydraulic operation. All

Bantam's 5 ton Compact

Low-loading dump body is a factory-mounted option available for new International model C-130 truck. Rated up to 8,800 lb. gross vehicle weight model C-130 features "low-profile" styling and is equipped with I-beam front end suspension and channel steel frame. Wheelbases range from 122 to 140 in. Standard powerplant is the International V-266 V-8 engine rated at 155 hp.

International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 123 on Enclosed Return Postal Card.

digging and lifting operations are cable operated while a modern, efficient hydraulic system controls the swing. The swing is obtained through a 12 gpm—1900 psi pump, two single-acting 6 by 34 in. rams, and a single row 3 in. chain. The arc of swing is 370 deg. either right or left. Swing speed is 5.5 rpm. A Continental F-162 gas engine powers the "250" upper unit. The 4 cylinder engine develops 37 hp. at 1600 rpm. A single shaft, mounting both hoist and drag drums as well as the boom hoist, controls all cable operations. A cast trunnion base features three combination hook and trunnion rollers. The compact is being offered initially to operate with five interchangeable front-end attachments: backhoe, crane, dragline, clamshell and shovel.

Schield Bantam Co., Waverly, Iowa.

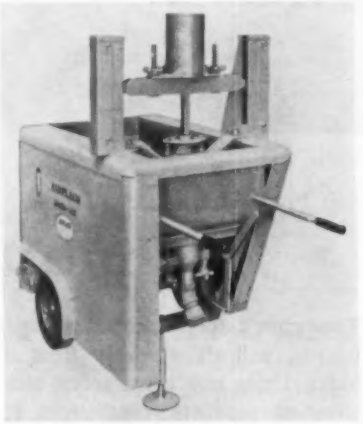
For more details circle 124 on Enclosed Return Postal Card.

Combination Pump

The Air Placement Equipment Co., known as Airplaco has released their new combination pump . . . the Hydra-Jak.

The firm is pointing its new Hydra-Jak towards soil cement applications for slab raising and leveling, commonly referred to as mud jacking, soil stabilization and underpinning. A combination pump, the Hydra-Jak may also be used as a sand-cement grouter in backfilling sewers, tunnels and forms.

Weighing 600 lb. the model HJ-11 "Hydra-Jak" is powered with a 6 hp Wisconsin air-cooled engine and has a field-tested performance of 85 cu. ft. per hr. and will pump at pressures up to 150 psi. Emphasized are the new permanently lubricated roller chain drive and coil springs overload which takes up slack of an overload or stop-



Airplaco's Hydra-Jak

page. Both features are designed to eliminate mechanical breakdowns frequently experienced with positive drive pumps.

The Hydra-Jak is equipped with wheel barrow type handles and two 12 x 300 semi-pneumatic tires and ball bearing wheels for portability on the job site.

Airplaco, 1000 West 25th St., Kansas City 8, Mo.

For more details circle 125 on Enclosed Return Postal Card.

Modern sports stadiums... modern CF&I Steel Products

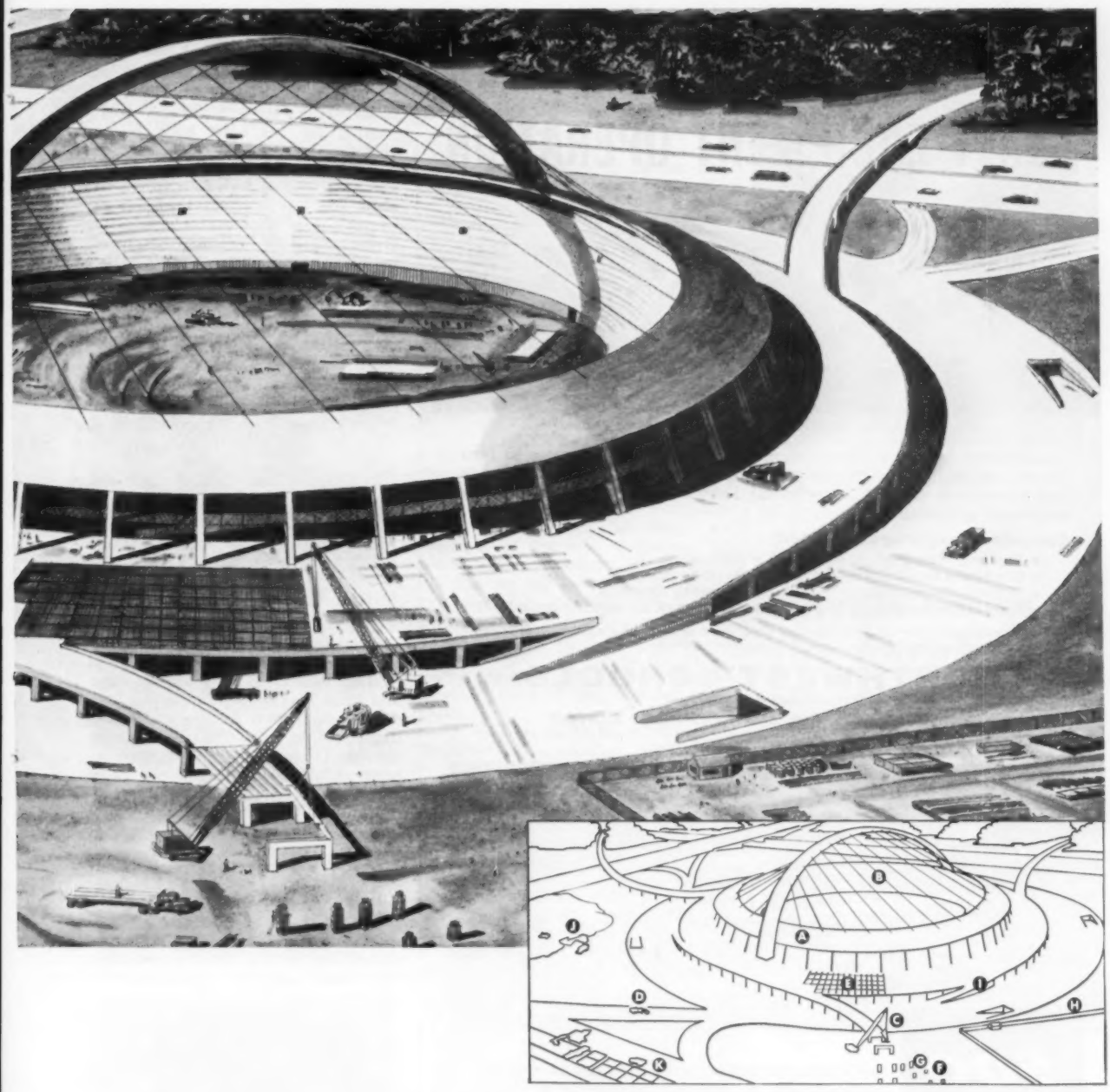
Tomorrow's sports arenas, many now on the drawing boards, will differ vastly from anything in existence today. Using new construction techniques and new construction products, contractors will erect a girderless stadium with an unobstructed view from any section — a stadium with a retractable roof that allows contests to be played in any kind of weather.

CF&I — a nationwide steel company — provides many different steel products for all types of construction, including sports stadiums like the one shown above.

CF&I Prestressed Concrete Strand and Wire **(A)** give the necessary tensile strength to precast concrete beams used in the grandstands of the stadium. These lightweight beams are also widely used in the underground parking area and the ramps leading to the stadium.

CF&I-Wickwire Wire Rope **(B)** could be used to support the transparent plastic roof which folds like an accordian at the arch. For more standard construction uses, CF&I's premium wire rope, Double Gray®-X, gives extra-long life because its wires are protected by a molecular shield of molybdenum disulphide. And *CF&I-Wickwire Wire Rope Slings* **(C)** are selected for safe, dependable hoisting.

CF&I Grader Blades and Cutting Edges **(D)** change hard, rocky ground into smooth roadbeds. *CF&I-Welded Wire Fabric* **(E)** provides steel reinforcement for concrete in main highways, access roads, parking areas and tilt-up constructions, giving them longer life and smoother surfaces. *CF&I Rebars* **(F)** strengthen the concrete columns which support the ramps leading to one of the



three-tier parking areas. And *CF&I Cal-Tie Wire* (G) in convenient belt-borne reels, permits safe, fast, economical tying of the rebars.

For maximum security of material and equipment stored outdoors, the contractors choose an easy-to-install *Realock Chain Link Fence* (H). It is widely used around parking fields and to control the stream of traffic from the parking areas to the stadium. In addition, Realock Fence is used to separate grandstand sections and is ideal for crowd control along overhead ramps and walkways.

Thousands of pounds of *CF&I Nails* (I) are used for wooden scaffolding and concrete forms, while much of the gravel and aggregate is sized on *CF&I Industrial Screens* (J). And *CF&I-Wickwire Automotive Springs* (K) are extensively used in trucks and service vehicles.

More and more contractors now realize that a domestic steel company—like CF&I—is best equipped to supply them with dependable steel products and expert on-the-job technical assistance. For complete details, contact a nearby CF&I office or write for Catalog G-104 "CF&I Steel Products for the Construction Industry."

THE COLORADO FUEL AND IRON CORPORATION

DENVER • OAKLAND • NEW YORK

Sales Offices in All Key Cities

... for more details circle 289 on enclosed return postal card

MEN TRAINED FOR HEAVY EQUIPMENT OPERATION

Students on the machines at Northwest's training grounds.

Contractors in many construction fields are finding it pays to hire Northwest trained heavy equipment operators. Our men have operating experience as well as technical knowledge of earthmoving and engineering fundamentals.

Complete training program includes:

- Blueprint Reading
- Grade and Grade Stakes
- Highway Construction
- Field Maintenance
- Estimating
- Basic Engineering
- Operating Controls
- Actual work on modern equipment

For information on our modern training program and trained men available in your area, contact Charlie Hillman, Heavy Equipment Director,

NORTHWEST SCHOOLS
(Portland-Hollywood-Chicago)
Home Office: 1221 N. W. 21st Ave., Portland 9, Oregon

... for more details circle 309 on enclosed return postal card

500 TONS OF CASTINGS DAILY!

With the recent opening of plant #2, shown above, our production potential of Gray and Ductile Iron Construction and Industrial Castings has now reached a maximum of 500 tons daily. This capacity, plus 15,000 patterns, plus a good on-hand supply of standard castings, plus 90 years experience in the business, is your assurance of prompt delivery, superior quality, complete uniformity and practical economy.

* * *

New and fully illustrated 168-page catalog of construction castings will be sent promptly upon request.

NEENAH FOUNDRY COMPANY
NEENAH • WISCONSIN
Chicago Office: 5445 North Neva Avenue, Chicago 31, Illinois

... for more details circle 308 on enclosed return postal card

Self-Propelled Drilling Equipment

A new, one-man, self-propelled, self-contained, hydraulically operated, Model H.D. 250-S hi-vacuum rotary drilling rig has been built by the Houston Tool Co.

It operates on a 30 hp., 4-cylinder, air-cooled engine with four speeds forward and one reverse. Hydraulically steered, it is maneuverable and the driving controls are immediately adjacent to the drilling controls with a

Houston's Self-Propelled Drill

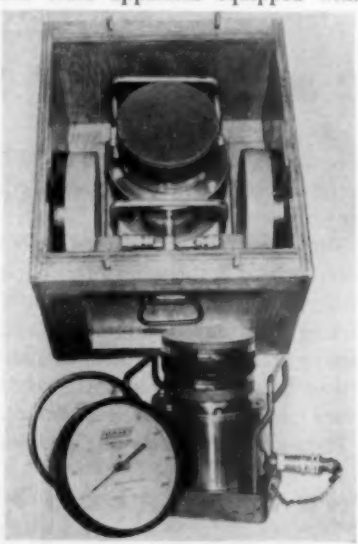
swing-away seat for the driver-operator that affords excellent driving and drilling vision. The rig has a tongue and hitch and the hydraulic system is made inoperative (neutralized) by a single simple valve for easy highway towing. Carrying all of its own equipment and tools this unit is said to be completely self-sustaining.

Houston Tool Co., Box 251, Santa Susana, Calif.

For more details circle 126 on Enclosed Return Postal Card.

Calibrating Load Cell

A new hydraulic load cell designed specifically for spot checking and recalibrating jobsite testing machines and other apparatus equipped with



Forney's Calibrating Load Cell

pressure gages has been introduced by Forney's Inc.

Consisting of a completely sealed hydraulic unit, it is equipped with a self-aligning pressure plate, and two load indicators. The loading capacity of the standard unit is 200,000 lbs. The apparatus is said to be virtually foolproof because there are no moving parts, no strain gage instrumentation and no conversion charts or factors.

Forney's Inc., Tester Div., Box 310, New Castle, Pa.

For more details circle 127 on Enclosed Return Postal Card.

100 Ton Lift Crane

100-ton lifts at 15 ft. ratios has been claimed for Manitowoc's newly-improved Model 3900 Crane which is also fully convertible to dragline or clamshell applications. Among the many new features is the lightweight "inverted angle" boom made of a special new alloy. Simple boom insert connections with a single bolt at each joint

Manitowoc's 100 Ton Crane

permit fast in-the-field addition or removal of extra boom sections.

New, 3-piece counterweight is self-removed by the machine itself without the use of jacks, blocking or other cranes. Another engineering advance is the "Dynamic Load Control" Device which consists of a hydraulic retarder with heat exchanger, and a reversing mechanism with clutch and air controls. This unit provides power lowering of full 100-ton load at lowering speeds comparable to hoisting speeds. Other features include: retractable high gantry which is easily raised or lowered by the boom hoist; automatic clutch throw-out limit stop for safe, close radius booming; independent boom hoist with air controls for greater handling precision; and independent swing which allows operator to boom, swing, and travel simultaneously.

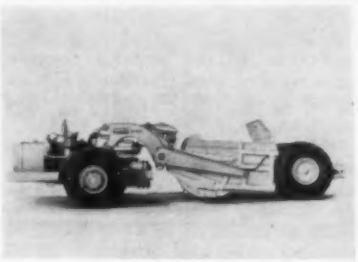
Manitowoc Engineering Corp., Manitowoc, Wis.

For more details circle 128 on Enclosed Return Postal Card.

Single Engine Scraper

A new overhung engine type scraper of 24 yd. struck capacity and 80,000 lb. payload capacity is being added to the Euclid line of self-powered scrapers.

The new model S-24 is powered by a General Motors 12 V-71 engine of 432 h.p. with dry-type air cleaner and Allison Torqmatic transmission with



Euclid's S-24 Scraper

converter lock-up and a splitter gear that provides a total of 9 speed and power combinations. A Torqmatic brake and No-Spin differental are available as optional equipment for special job requirements. Drive axle is full floating with planetary reductions in each wheel. Steering is full hydraulic with a two jack system and 90 deg. swing. Wheel base is 27 ft. 7 in. and overall length is 42 ft. 4 in. All scraper operations are hydraulically controlled. Bowl is raised by two interchangeable jacks.

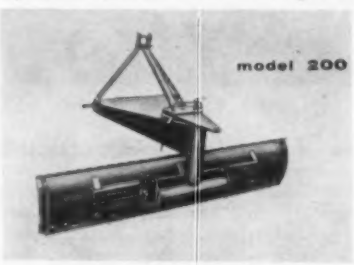
Euclid Div., G. M. Corp., Cleveland 17, Ohio.

For more details circle 129 on Enclosed Return Postal Card.

Rear Dozer Blades

Two models of rear scraper blades, for use on 2-point and 3-point hitch tractors, are now being marketed by Freeman Industries, Inc. Both blades feature a ½ in. by 6 ft. carbon steel cutting edge that is reversible.

Model 100 has seven forward angle adjustments, offsets 12 in. to right or



Freeman's Scraper Blades

left and has a rib-reinforced tubular frame. Model 200 has nine forward angle adjustments; three pitch and three reverse adjustments; and tilts 15 deg. It offsets 12 in. to right or left, and has rugged box constructed main frame. Either model is available for two-point hitch tractors states Freeman, the manufacturer.

Freeman Industries, Inc., Peru, Ind.

For more details circle 130 on Enclosed Return Postal Card.

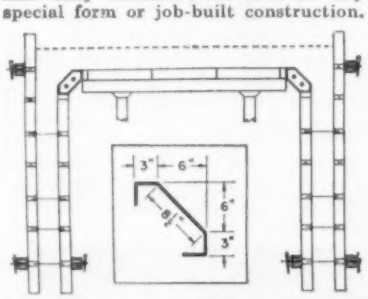
Job Finished 3 Weeks

How to Pour a Tunnel in a Hurry...

Symons Culvert Forms The Answer

When awarded a contract to build a 340 ft. tunnel, Schweiger Construction Company, Kansas City, Mo., faced the problem of how to do it fast and as economically as possible.

Symons Culvert Forms solved the problem. They eliminated the need for any special form or job-built construction.



Schweiger used Symons 1' steel channel filler horizontally on top of 6' vertical panels on the inside of the walls. Culvert Forms were placed on top of this filler. The forms underneath were stripped with no difficulty and the fillers and culvert forms were then removed without disturbing the decking for the slab, which was left in place for an additional curing period. Walls and top slab were poured monolithically in three pours. *Job was completed in three weeks.*

Symons forms, shores and column clamps may be rented with purchase option. Additional information on *Symons Culvert Forms* is available upon request.

Symons

SYMONS CLAMP & MFG. CO.

4283 Diversey Ave., Dept. C-1, Chicago 39, Ill.

MORE **SAVINGS** FROM **SYMONS**

... for more details circle 355 on enclosed return postal card

Lightweight-Universal Boots

A new type of boot that is made entirely of gum rubber and stretches well enough to deem only two sizes necessary has been introduced by the So-Lo Marx Rubber Co.

Weighing only 9 oz., the boot stretches to easily fit all styles of men's

So-Lo Marx' Lightweight Boots

shoes. The size offered are 8 or 12½. There is no cloth fiber or re-used rubber in these boots, states the manufacturer. They may be washed by laundry equipment and will dry instantly. The versitility allows the same pairs of boots to be used by several different men with varying shoe sizes, cutting down on inventory. The non-skid safety shoes are reinforced to perform long service. Storage is easily handled by simply rolling one boot around the other into a neat package.

So-Lo Rubber Co., Loveland, Ohio.

For more details circle 131 on Enclosed Return Postal Card.

Truck Tires

A new truck tire that features a three-rib bladed tread design has been announced by the Firestone Tire & Rubber Co.

Firestone's Transport 100

This new tread design, will give the tire 50 percent more mileage than previous 100 level Firestone original equipment truck tires the company said in announcing the new Transport-100.

A broad center rib with extra large tread elements are arranged in a rope-like pattern using improved rubber compounds that enable tires to run cooler. Built-in traction slots are another feature of this all-wheel position truck tire. In the popular 10.00-20 size, a total of 1008 traction blades in the tire mold give the new tire better road traction.

Additional new features of the tire are a flatter crown for equal pressure throughout the tread print and extra load hauling efficiency and stone guards in the tread to keep it free of damaging gravel and pebbles.

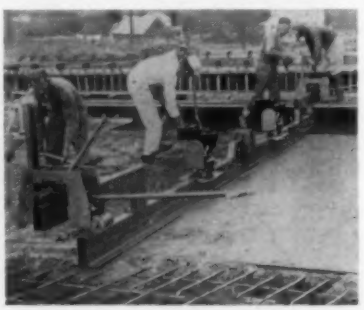
Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron 17, Ohio

For more details circle 132 on Enclosed Return Postal Card.

Two New Vibrating Screeds

To new versatile all steel vibrating screeds have been developed by Stow Mfg. Co.

The models SSG and SASG are reputed versatile in that they are adjustable for length, speed, amplitude and crown. The SSG screed may be useful for striking off slabs of any length up to 30 ft. and with a crown adjustment of up to .025 in. per ft. of beam length. The screed package con-



Stow's Vibrating Screed

sists of a 3 hp. gas driven adjustable amplitude screed power pak, two heavy duty lift up roller assemblies with 9:1 ratio winches, and a double flange, adjustable crown all-steel beam. The heavy-duty roller assembly has rubber mounts to isolate the vibrations from the forms and the operator and is attached to the beam using a safety track. This safety track allows the rollers to move easily back and forth on the beam to get an adjustment of up to 6 ft. on the length of beam span. Two men can pull the screed at an even steady rate by using the 9:1 ratio winches bolted on each end.

Stow Mfg. Co., 65 Shear St., Binghamton, N.Y.

For more details circle 133 on Enclosed Return Postal Card.

Adaptable Scraper

A new, larger and more versatile version of its Graderscraper was recently announced by Martin Co. Designed for Caterpillar Motor Graders, the Graderscraper is a 4-cu. yd. (heaped) scraper that mounts in place of the blade and circle on the grader.

The new Model, the GS-40, carries a full half-yard more material than the

Martin's Graderscraper

previous model. It is designed for faster loading, even on adverse uphill grades. Optional sideboards are available to increase the capacity. It will load in 2nd or 3rd gear without push-loading. Once loaded, the bowl can be lifted with the grader's circle lift arms and carried at speeds up to 20 mph. to the dump area. Clearance in "carry" is 12½ in. Positive ejection is hydraulic, bulldozer-type. Even sticky material passes through a wider 27½ in. apron opening. To suit job demands, "Graderscraper" can be dumped in any gear, forward or reverse. Heavy, box-section draft arms and a rugged bowl give the Martin scraper a stiff backing for the 8 ft. wide cutting edge. High-carbon, abrasion-resistant steel blade and stinger bits are standard; a frost bit blade is optional. A maximum spread of 12½ in. deep can be obtained, and the cutting depth is limited only by practicability.

Martin Co., Kewanee, Ill.

For more details circle 134 on Enclosed Return Postal Card.

Auxiliary Transmissions for Pickup Trucks

It is now possible to mount auxiliary transmissions to pickup trucks with "X" frame construction, according to transmission manufacturers, H.S. Watson Co.

When the Brownie-Junior, as the new transmission is known, is installed in the underdrive position it provides a simple means of mounting and driving a power take-off. Engine power is thus made available for driving winches, compressors, saws and many other truck-mounted equipment, as well as equipment that is normally operated with tractor-mounted power take-off.

H. S. Watson Co., 1316 67th Street, Emeryville 8, Calif.

For more details circle 135 on Enclosed Return Postal Card.

Continued on page 177

ALPHA

BETTER CONSTRUCTION THROUGH
BETTER USE OF CEMENTS

news and notes from the field

Tips On Building Watertight Concrete Structures

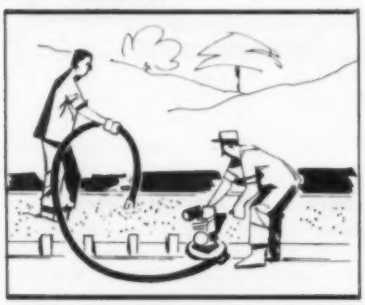
The increasing use of concrete for swimming pools, basement playrooms, industrial sub-surface garages and similar structures continues to reflect the growing interest in watertight concrete. Moreover, of the many questions asked Alpha Field Engineers, those about watertight concrete today are one of the most common.

Watertight concrete can be produced without undue difficulty when proper emphasis is placed on good design, good concrete and good workmanship. Extensive testing and careful examination have revealed that the most common reasons for leaky concrete are **inferior workmanship, poor materials and too lean a mix.**

Good Concrete:

Modern ready mix concrete plants today are equipped to furnish concrete of the very highest quality, but the user must specify the mix and make sure the concrete is not ruined on the job by someone insisting on additional water. The most modern mixing plant, the best materials and the best mix design mean nothing when the water content is not controlled and the concrete is improperly placed and cured.

The Right Mix:



Use a quality concrete mix and place it in even layers not more than 18 in. deep. Avoid honeycombing by adequately spading or vibrating each layer.

Experience has indicated that for such structures as tanks and reservoirs the concrete should contain not more than 6 gal. of water per sack of cement. For concrete in very heavy sections such as dams, the water may be increased to 7½ gal., while for thin sections it should be reduced to 5 gal. These amounts include the water which is introduced as surface moisture in the aggregate. Coarse aggregate usually contains little if any moisture, but the sand often contains a considerable amount of water.

Avoid Segregation in Placing Concrete:

Concrete should be delivered at a number of points around the form to avoid chuting over long distances. This prevents segregation, a source of possible leaks.

Of all the steps in watertight concrete work, handling, placing and compacting in the forms are among the most important. Concrete should not be allowed to drop freely more than 5 or 6 feet, as segregation is likely to occur if it falls through a greater distance. Flat chutes should not be used even for short distances. **Chutes should be deep with rounded bottoms, and constructed of or lined with metal.** Buggies should be operated on smooth runways. Buggies equipped with pneumatic tires reduce segregation. Dumping a large quantity of concrete in one place and then causing it to flow horizontally over a long distance in the form is not good practice and should never be done. Concrete should be distributed by placing in uniform layers 1 foot to 18 inches thick, spading or vibrating each layer to consolidate the concrete.

Construction Joints:

One of the frequent sources of difficulty has been at construction joints. Wherever possible, the work should be so planned that placing of concrete will be continuous. In large structures expansion joints are sometimes provided, but placing should be continuous between joints. Where a construction joint must be made, precautions should be taken to secure good bond between the layers. If the structure is to be subjected to water pressure such as in a tank and if a construction joint is to be made between hardened and fresh concrete, a waterstop should be installed.

Curing:

Keeping the concrete wet for at least 7 days when normal portland cement is used, or 3 days if high-early strength portland cement is used, should be required on all watertight construction.

Surface coatings are helpful in overcoming leakage on some structures, but cannot be expected to overcome faulty joints or defective areas. An effective surface treatment is the application of a grout of equal parts portland cement and fine sand mixed to the consistency of paint and applied with brushes. The concrete should be damp when this is applied and the coating should be dampened as soon as the cement has set sufficiently so that it will not be washed off. It should be kept damp at least 24 hours.

Use whitewash-size brush to apply surface coating.

More Information

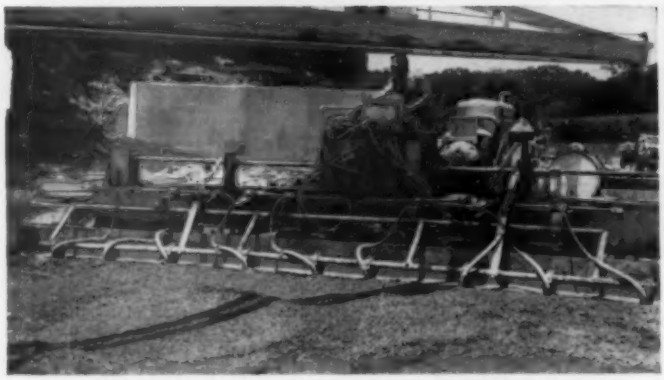
Your Alpha Field Engineer can answer your questions on watertight concrete construction and help with any other problems involving the use of Alpha cement. Reprints of this advertisement are yours for the asking.

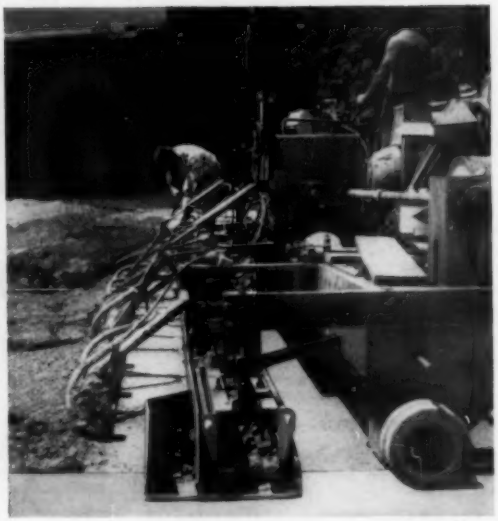
ALPHA
PORTLAND CEMENT COMPANY
Alpha Building, Easton, Pa.
... for more details circle 367 on enclosed return postal card

ONLY MAGINNISS FULL SLAB

VIBRATOR

ATTACHMENTS





give you these

Plus BENEFITS

★ MAGINNISS Hi-lectric motor-in-head design Vibrator allows cooling of motor by surrounding concrete.

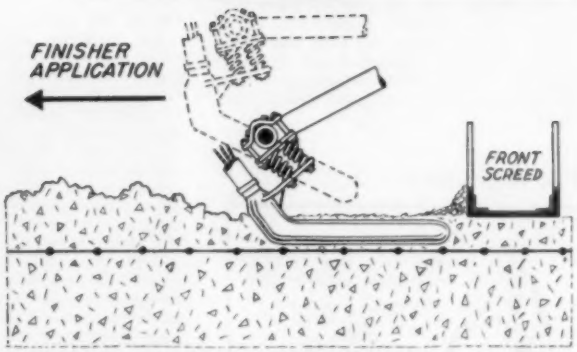
★ Induction type motor gives constant speed under load. No brushes or commutator; spark-free — it is simple to maintain.

★ Motor drives eccentric direct — No flexible shaft.

★ Spacing, angle, depth and frequency are completely adjustable by the prime machine operator — to meet any and all job conditions.

★ The unit mounts easily on any spreader, finisher, combination spreader-finisher or slipform paver, without changing its balance or movability.

★ The generator is smaller in size and weight than that required to operate series-motor vibrators. It takes up less room on the machine.



Quickly mounted on any finisher or spreader. No auxiliary carriage required. All attachment parts are furnished complete.

WHERE TO USE IT:

• City Concrete Paving • Airport Runway Paving •
• State Highway Paving • Canal Spillways •
• Highway Widening •

WRITE FOR COMPLETE INFORMATION — or call your nearest MAGINNISS Distributor. He's listed under "Contractors Equipment" in 85 principal cities.

Find your nearest distributor in the Yellow Pages

Maginniss HI-LECTRIC VIBRATORS

MAGINNISS Power Tool Company
154 Distl Avenue, Mansfield, Ohio

. . . for more details circle 306 on enclosed return postal card

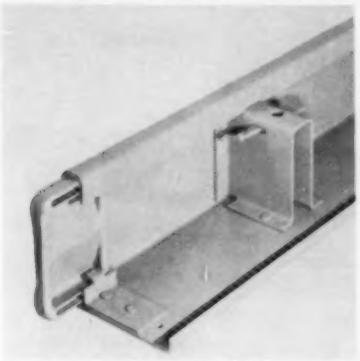
New Products

Continued from page 174

Heavy Duty Road Forms

A new ¼ in. heavy duty road form was recently introduced by the Metal Forms Co.

Three ¼ in. plate stake boxes, designed to keep the form rigid, keep the face at a 90 deg. angle to the base and remain free of concrete, states the



Heavy Duty Road Forms

manufacturer. The top flange, which is turned down, is 2 in. deep and reported to give the top tread greater strength to resist both horizontal and vertical deflection. Added support is given because the bottom of the top flange rests in slots in the top of the three stake boxes. The form is available in either fixed ¼ in. plate end connection or a sliding end connection. The form is also available with or without the turned-up bottom flange and with the base widths the same more than or less than the height.

Metal Forms Corp., 3334 N. Booth St., Milwaukee 12, Wis.

For more details circle 136 on Enclosed Return Postal Card.

Heavy-Duty Trailer Rake

Weighing in at 1,750 lb., and featuring both raking and reinforcing teeth, the York Rake, Model RC, brings speed and efficiency to land clearing and soil construction projects.

This heavyweight is designed to fill the need for a mechanical tool to remove large stones and debris. The RC is a trailer-type rake with a 2-way hydraulic system capable of utilizing both hydraulic down pressure and the entire weight of the machine for penetration. Raking teeth are spaced 3¼ in. apart to screen out smaller material while discharging large stones and debris into a row. Auxiliary teeth, 8 in. shorter than the raking teeth, reinforce the raking teeth without interfering with their "fingering" action. The rake will gather large stones for removal or for processing with a portable crusher. Contractors engaged in grading work may use it for stabilizing shoulders along paved highways, and similar jobs where large rocks and debris must be removed to provide proper finished surface. Length of the RC rake is 14 ft. 7 in. overall; working width is 9 ft. 4 in. There are 32 raking and auxiliary teeth.

York's Heavy-Duty Rake

York Modern Corp., Unadilla, N. Y.

For more details circle 137 on Enclosed Return Postal Card.

Asphalt Highway Maintenance

A new asphalt highway maintenance machine for use in maintaining asphalt highways has been put into production by the Cutler Engineering Co. Known as the Cutler Repaver it combines in one machine all the processes necessary to repair any defect in an asphalt highway and then resurface the area with a new 50 lb. hot mix seal coat.

Four operations are necessary to repave an asphalt highway: heating; leveling; relaying and compacting. Heating, is accomplished in an insulated lined grid chamber using four air atomizing 10 gal. per hr. diesel oil burners. These four burners use direct, radiant, and converted heat to accomplish the heating assignments. A patented nickel iron grid roll floats inside this chamber to channel the heat to the pavement by radiation and direct contact. This 4,000 lb. unit kneads the loose asphalt and thoroughly vulcanizes it to the existing mat, states the manufacturer.

Cutler's Repaver

Leveling is carried out by using a conventional grader blade actuated by hydraulic cylinders working against mechanical stops. The Repaver weighs 12 tons.

Cutler Engineering Co., 5435 W. 63rd St., Chicago 38, Ill.

For more details circle 138 on Enclosed Return Postal Card.

Backfill Blades

Three new backfill blades for the Hopto hydraulic excavator Series 500, 200 and 110 Snap-Mount, have been announced by the Warner & Swasey Co.

The 4 ft. blades range in size from 8 ft., weighing 490 lb., down to 4 ft., weighing as little as 130 lb. These new blades are designed to fasten onto the Hopto excavating bucket, and the change from excavating to the backfilling operation can be accomplished in a fraction of the time required to completely change from one attachment to another. The company also points out that the blade can be carried piggy-back from job to job. It eliminates the need for additional specialized backfilling equipment.

Hopto Backfill Blades

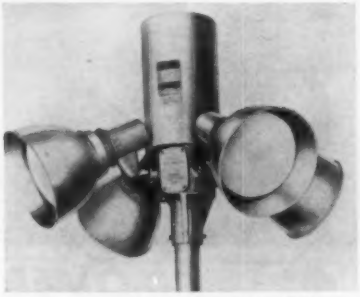
Badger Div., Warner & Swasey Co., Winona, Minn.

For more details circle 139 on Enclosed Return Postal Card.

Mercury Vapor Pole Top Assemblies

A complete line of outdoor type mercury vapor pole top assemblies using maintenance-free reflector lamps is now being marketed by Shalda Mfg. Co.

Each assembly comes complete with lampholders, ballast and glare tubes or shields. Assemblies are offered in beam patterns and wattages in a range of primary voltages. Lamps are mercury type. Ballasts are low temperature, high power constant wattage, weather proof. Accessories are available to provide for wall or side pole mounting.



Shalda's Pole Top Assemblies

Shalda Mfg. Co., Inc., Box 507, 156 W. Providencia Ave., Burbank 51, Calif.

For more details circle 140 on Enclosed Return Postal Card.

NEW

SCORES INSTANT SUCCESS

Compacts clay fast
Saves on labor
Cuts downtime

J-RAM

Another RELIABLE tamper by Jay

This new Jay Tamper gives better, faster earth compaction. Savings up to 90% and more. Easy to meet Proctor density spec. anywhere . . . under foundations, in ditches, under slabs. Weighs only 135 pounds. Engine 4-cycle, cast-iron—450 to 675 blows per minute. Choice of tamping plates. Save "downtime" expense. Get a demonstration; find how Jay Tampers can save and EARN money for you.

Best on Earth

JAY tampers

Jay Company Division, J. LEUKART MACHINE CO., INC.
2222 S. Third Street, Columbus 7, Ohio

. . . for more details circle 337 on enclosed return postal card

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STONE AND ASPHALT SPREADER

A BIG-JOB PAVER AT A SMALL-JOB COST

You can do fast, high-quality paving with this small, compact, low cost machine. Lays any type commercial asphalt. Easily handled on small jobs, highly efficient on the largest job. A proven money-maker for contractors and highway departments everywhere.

GET THE FACTS . . . WRITE FOR DESCRIPTIVE BULLETIN TODAY.

I. J. OVERMAN MANUFACTURING CO.
BOX 896 MARION, INDIANA

. . . for more details circle 310 on enclosed return postal card

Highway Vacuum Cleaner

The introduction of a new vacuum street and highway cleaner, the Vac-All Model E-5, was made by Central Engineering Co.

It is designed for picking up and hauling heavy street and highway debris, stones, sand, bottles and the like. As a catch basin cleaner, the device removes catch basin muck, gravel, rock, sand and silt. The machine has

Central's Vac-All

a 16 cu. yd. self-contained, fully enclosed body built for hauling heavy materials. The heavy debris enters the body directly without passing through the blower. A high vacuum is maintained by a high pressure blower which in turn is driven by a 103 hp. 6 cylinder industrial engine. The intake hose is supported by a top revolving boom and the entire assembly can be moved in a few seconds for loading from the rear. For dumping the load, a heavy duty hydraulic hoist is used.

Central Engineering Co., Inc., 4429 W. State St., Milwaukee 8, Wis.

For more details circle 141 on Enclosed Return Postal Card.

Portable Cable Unit

A small sized portable cable processing unit that cuts and repairs cable, makes slings, eyes, chokers and splices right on the job is being manufactured by Mark Naught, Inc. The new machine was developed to cope with and reduce costly and time consuming operational requirements wherever cable is used. The Mighty Mark, as the new

Mighty Mark Splicer

machine is called, is a self-contained portable hydraulic press. Although it weighs less than 70 lb. small Mighty Mark exerts 15 tons of pressure and handles cable up to ½ in. under all types of conditions; the larger Mighty

Mark handles cable from ½ in. up. Hydraulic pressure in the machine is generated by manipulation of a 9 in. hand lever with no outside power required.

Mark Naught, Inc., 322 Lumbermens Bldg., Portland 4, Oregon.

For more details circle 142 on Enclosed Return Postal Card.

Crane Converts To Gantry

According to a recent announcement from Manitowoc Engineering Corp., Manitowoc crawler cranes can now be converted to gantry use for specialized applications, and then readily switched back to conventional crawler mountings. This is accomplished through the use of conversion kits which are now available for Manitowoc Model's 3900, 4000 and 4500 liftcranes.

Conversion from one mounting to another is said to be simplified because of the Manitowoc "carbody" design

Manitowoc—Crane Converts to Gantry

which is one-piece with integral wings which bear directly on the crawler frames. The user simply unbolts the crawler assemblies and slides them off and then bolts the crane carbody on top of the gantry mount. When it is no longer necessary to use the crane on a gantry, it is taken off that mount, and the crawlers bolted back on, ready for use as a conventional crawler crane. Other features such as Manitowoc self-removing counterweight and folding gantry are said to expedite the procedure.

Manitowoc Engineering Corp., Manitowoc, Wis.

For more details circle 143 on Enclosed Return Postal Card.

Black-Top Distributors

The addition of a new model to their line, the FX 500, was recently announced by E. D. Etnyre & Co.

Engineered for minimum weight and maximum legal payloads, the new machine makes extensive use of hard aluminum and stainless steel jacketing.

A special feature of the FX 500 is the new 400 gpm heat-jacketed pump which is heated by engine exhaust directed into the jacketed pump case surrounding the pump impellars. Hot air is then directed to the intake valve above the pump after passing through ducts in the pump case. With suction on top and discharge at bottom, pump is self-draining and there are no low

Etnyre's Blacktop Distributor

points to trap material which flows straight through. Tank insulation is 2 in. fiberglass with asbestos blocks for spacers to maintain full insulation without compression.

Standard equipment on the rig is a full circulating spary bar. This bar combines all the advantages of full material circulation with a 92 deg. rotation up from spraying position for complete valve drainage and elimination of the chance to drip.

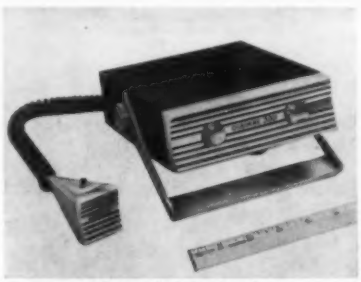
E. D. Etnyre & Co., Oregon, Ill.

For more details circle 144 on Enclosed Return Postal Card.

Citizen's Band Transceiver

A new, all transistor Citizens' Band transceiver has been announced by Osborne Electronics Corp. Called the Osborne 300, the unit is said to be small and light-weight. The 9 transistor circuit requires less operating power than the conventional tube type units.

Operating on any of the 23 allocated Citizens' Band channels, it features a 4 channel selector with plug in crystals.



Osborne's Transceiver

A rugged all metal die-cast case measuring 1-⅞ x 6 x 7 in., a squelch control, noise limiter and a push-to-talk microphone with a 3 ft. coil cord are standard equipment.

The small size makes it an ideal mobile unit that will easily fit under any dashboard not taking away leg room. Also available is an accessory mobile/marine mounting bracket which will

a product of and for TODAY'S TECHNOLOGY

ALMASOL 1225

BEARING AND CHASSIS LUBRICANT

CUSTOM-ENGINEERED to withstand

- WASH-OUT
- POUND-OUT
- MELT-OUT

ALMASOL 1225 keeps working when "ordinary" gun lubricants break down and allow costly metal-to-metal contact, rapid wear, galling and seizing!

ALMASOL 1225 combines the finest available paraffin-base oils, refined to maintain the highest degree of lubricity, superior adhesive properties and resistance to oxidation, and **ALMASOL,** a specially refined additive possessing tremendous load-carrying ability, resistance to all types of acid wear, under high temperature conditions **without change** in these vital characteristics!

Lubricants that were barely adequate in 1957 cannot be expected to do the jobs demanded of today's equipment. Protect your investment with **ALMASOL 1225!**

Used extensively on all types of construction equipment, trucks, industrial and farm machinery, **ALMASOL 1225** saves money for thousands of owners and operators. We would welcome the opportunity of furnishing **you** with more complete information.

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... for more details circle 299 on enclosed return postal card

POWERFUL *NEW* BEEBE RATCHET-HOISTS

SNAP-ON QUICK-REVERSING HANDLE
SELF-ALIGNING CABLE GUIDE
REMOVABLE PULLEY AND HOOK
Pats. Pending
CAPACITIES 750 LBS. TO 4000 LBS. FULL LINE

The Quality Hoist Built to Last By Beebe Bros.

Beebe Ratchet-Hoists set a new high standard of quality. Will out-perform and out-last them all. Fewer parts, simplified design. Full strength frames of light-weight aluminum alloy. Cable wind-up standard equipment. Safety handles bend under overload. Fully warranted for 1 year against defective parts and workmanship. Ask your equipment distributor about Beebe Ratchet-Hoists.

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MANUFACTURING COMPANY
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Seattle 4, Washington
Copr. B.B.

Beebe Winches . . . strongest geared power for its weight in the world.

provide a simple snap-action release for easy removal.

Osborne Electronic Sales Corp., 13105 S. Crenshaw Blvd., Hawthorne, Calif.

For more details circle 145 on Enclosed Return Postal Card.

Mobile Cement Gunning Machine

A new self-contained and self-propelled cement gunning machine is being produced and marketed by Zimmerman Mfg. Co.

Completely controlled and operated by one man, the Pneumatcrete incorporates two separate functions into one mobile and compact piece of equipment; it efficiently performs the function of a stationary central plant and also that of a mobile cement gunning machine. The machine consists of a large steel pressurized tank inside of which are separate compartments for the storage and transportation of sand, cement, aggregate and water. The steel shell also houses conveyor systems which feed the various ingredients to the mixing chamber at the rear of the tank. A drive shaft PTO provides the power to operate the internal conveyor systems and mixing chamber and also to drive the heavy-duty 500 cfm rotary air compressor, an integral part of the rig.

Zimmerman's Gunning Rig

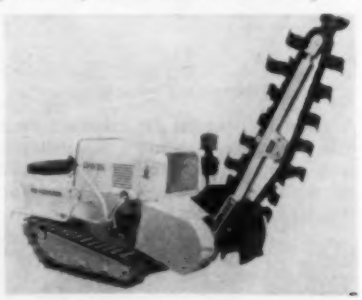
Zimmerman Mfg. Co., Ephrata, Penn.

For more details circle 146 on Enclosed Return Postal Card.

Trencher-Backfiller

A new trench-backfiller, model C Davis T-66 is being introduced by Davis Mfg. Inc.

The new crawler-type unit is reported by its manufacturer as capable of digging straight and quickly. It obtains positive traction with maximum flotation by the use of broad, self-cleaning track shoes that create 3.6 lb of ground pressure per sq. in.



Davis' Trencher-Backfiller

Among the new features of the Model C Davis T-66 that enable it to operate in severe digging conditions are: a heavy-duty boom; grit-and moisture-proof seal bearings; built-in, pre-loaded boom shock absorber to cushion digging impact without power waste; freeze-free auger mounting; pre-loaded torwue limit clutch that eliminates shear pins; and simplified, quality-proven hydraulics.

Davis Mfg. Co., 1500 S. McLean Blvd., Wichita 13, Kan.

For more details circle 147 on Enclosed Return Postal Card.

Gravity Fed Line Roller

The gravity-feed Florline Marking Machine that rolls lines, is now combined with a spray machine to make it a multi-duty "Two-or-One" unit used for a variety of paint applications. The "Two-or-One" Florline is two independent machines that may be used together or separately, by one operator or two as manpower dictates.

The 5 gal. Florline rolls safety and parking lines with no mist hazard to cars or stock; makes lines flush to barriers and vertically up curb or wall states the manufacturer. The companion unit is composed of a 3 hp. Briggs & Stratton engine, piston-type compressor and spray gun. It is reported able to spray curbs, posts parking barriers, stencils and serves as a portable compressor for many other air and painting needs.

Florline Marking Machine

For two-man operation, the units are separated in seconds and save the cost and inefficiency of two men being on-the-job with only one machine to use.

H. C. Sweet Company, New Hucksson, Michigan.

For more details circle 148 on Enclosed Return Postal Card.

. . . for more details circle 280 on enclosed return postal card

Lightweight Radio

A new line of lightweight, compact two-way radios for the construction market has been introduced by General Electric.

G.E.'s Compact Pacer

The G.E. Pacer uses vacuum tubes and simplified circuits in a design achieving lower battery drain than often attained in tube equipment. Designed for operation in low band, 27-50 mc., and high band, 150-174, the units have full-qualify VHF-FM audio. It has 15 tubes and 2 transistors. When the 15-watt unit in "on", battery drain is said to be 4.2 amp. That is a full ampere less than the 10 watt tubed units, the manufacturer reports. Special generators and heavy duty batteries are not needed, states G.E. The control section contains a transistorized power supply adaptable to 12 volt negative or positive ground electrical systems, which eliminates vibrators. This new design is the smallest in G.E.'s entire line of 2 way communications systems.

General Electric, Communications Products Dept., Lynchburg, Va.

For more details circle 149 on Enclosed Return Postal Card.

Rotary Drill Rigs

The news of a new line of mechanical drive rotary drills for bit size of 3 to 4½ and 6 to 7⅞ in. has been

LeRoi's Rotary Drill Rig

released by LeRoi Div. of Westinghouse.

Jennite J-16® protects

"Main Line of the Empire State"

Solves major maintenance problem for New York Thruway Authority

There are over 470 bridges on the New York Thruway's 533 miles of super highway. Since bridge decks always freeze before highway pavements, vast quantities of de-icing salts must be employed to keep these safe for motorists.

. . . and Jennite J-16, with special abrasive grit, is used to protect concrete bridge surfaces against water and salt penetration . . . other damage incident to freezing and thawing.

In addition, Jennited surfaces absorb more heat from the sun than uncoated areas, thereby speeding thawing action.

Find us fast in the 'Yellow Pages'

For complete information about Jennite J-16, Write for Bulletin M-2992. Also, see our catalog in Sweets.

MAINTENANCE INC. WOOSTER, OHIO

Distributors and stocks in principal cities.

. . . for more details circle 369 on enclosed return postal card

Designated the LRD-2 and LRD-3, these units are truck, crawler or wheel mounted for rotary or down-the-hole drilling. Through a series of gear reductions in the drive shaft which build up a high torque, the LRD-3 maintains steady drilling action and constant rpm. on the bit at low engine speeds, reports LeRoi.

The driller can adjust to the formation being drilled with a choice of ten forward and two reverse gears between 9 and 168 rpm. The hdyraulic chain pulldown exerts up to 30,000 lb. pressure on the bit through a 4 speed transmission. Pressure range from 100 to 500 psi in each gear to prevent the oil from overheating.

LeRoi Div., Westinghouse Air Brake Co., Sidney, Ohio.

For more details circle 150 on Enclosed Return Postal Card.

New Dump Trailer

A new design concept in dump trailers now enables trailer owners to gain maximum axle-load allowances in all 50 states by hydraulically positioning the payload on an extra length trailer chassis, reports the Daybrook Hydraulic Div.

The Hydra-Shift Pay-Pac uses a 4 section, telescopic double-acting hydraulic hoist to both position the 24 ft. body on the extra-length chassis and to dump the payload. A single cylinder moves the Pay-Pac through its entire dumping cycle. From its predetermined transport position, governed by local gross weight restrictions and number of axles carrying the payload, the body is hydraulically moved to the rear where it automatically locks for dumping. Smooth, continuous power

Daybrook's Pay-Pac

on the hoist raises the body to its dump position. After the load is discharged, the body is returned to its forward transport station where it automatically locks into position.

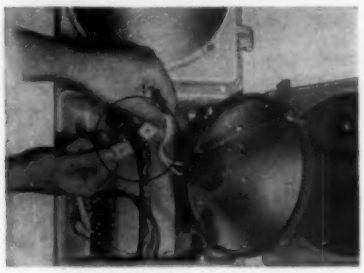
Daybrook Hydraulic Div., Young Spring & Wire Corp., Bowling Green, Ohio.

For more details circle 151 on Enclosed Return Postal Card.

Maintenance Aids

A quick disconnect plug and socket, the use of which permits removal of the optical unit from a traffic signal entirely without the use of tools has been introducted by the Marbelite Company, Inc.

The unit consists of a polarized plug and socket molded to the rubber insulated wires connecting the lamp socket to the terminal block. The entire unit is color coded for easy identification, and available in red, amber, and green. In order to remove the reflector, reflector ring, or complete optical unit from a signal section for maintenance, it has until now always been necessary to disconnect with tools the wire leads from the signal terminal block. By using the new Marbelite "quick disconnect plug socket" it is



Marbelite Plug and Socket

not necessary to go to the terminal block. To disconnect the wires, the plug and socket, located 5 in. from the lamp socket, are pulled apart, and the entire optical unit may then be taken out of the signal section. This action is reversed when replacing the optical unit. Due to the polarized plug and socket it is impossible to reverse the wires when connecting the unit.

Marbelite Company, Inc., 175 N. 10th Street, Brooklyn 11, N. Y.

For more details circle 152 on Enclosed Return Postal Card.

Bitumen Rubber Sealant

A new bitumen rubber for curing in place by means of simple mixing, and with adequate working time for either pouring or standard caulking application, is now available in the Poly-Chem UT series.

UT is a soft rubber designed for the permanent sealing of joints under all atmospheric conditions. The UT compound is a rubber modified by a bitumen so it will elongate easily in expansion or distortion without undue strain on its bond to the adjoining surfaces. The UT compounds are said

Continued on page 194

Acme SCREENS

UNIFORM MESH HELPS YOU INCREASE PROFITS

The uniform mesh in Acme Screens assures you faster separation of sand, gravel and other abrasive materials *at less cost.* Pre-crimped to exact sizes for proper spacing — no irregular openings to slow the flow of materials. Made of quality steel and alloys, Acme Screens are abrasion-resistant — last longer. Made in Texas — which is important when you want *faster delivery.*

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- Ram
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Special Cores made to order

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Drag Broom Levelers
Street Push-Concrete Brooms

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KENNEDY'S

VAN BRUSH MFG. CO. INC.

2728 McGee Trfwy. Kansas City, Mo.

NEW SHOVEL PADS

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30" Manitowoc $44.00
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B.E. 22B - This pad is twice E.O.M. Utg. for extra heavy duty $24.00
820 Lorain $66.00

ALSO: We will send samples for your inspection - we know they are superior. For entire set purchased - assembly free.

ALSO OTHER PADS: Nearly every make and model. Give model No. and width for quotation.

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53 Gerard Street - Boston 19, Mass.
Highlands 2-4160

DISTRIBUTORS WANTED

3000 Watt AC Generating Set

Engine Model ZXB Hercules, 4 Cylinder Water cooled with 6 volt Starter, Hobart Generator, 115 Volt, 60 Cycle, 1200 RPM. Completely Hooded with panel board. All diam. 53" long, 25½" Wide, 31½" High. Shipping weight 791 lbs.

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SALES ENGINEER

Must be experienced in heavy construction equipment; preferably asphalt plants.

Applicant should be agreeable to headquartering in U.S. Company's Central America Office.

Position will involve considerable travel throughout Central and South America.

Excellent opportunity.

Send complete resume to Box 1236 Roads & Streets 22 W. Maple St., Chicago 10, Ill.

CONSTRUCTION SUPERINTENDENT

Heavy, highway and street construction. Location - Southern New York State. Civil Engineering Degree preferred. Chance for advancement with growing firm.

Write Box 1235 Roads & Streets
22 W. Maple St., Chicago 10, Ill.

FOR SALE

1—Model 879A Barber-Greene asphalt finisher, s/n: 52-258, on 10" crawlers, with LeRoi engine, 10 ft. width; with 2 ft. extensions, with bevel end plates, excellent condition, Price $8,000.00

1—Model 879 Barber-Greene asphalt finisher, s/n: 879-6-27, with 10" crawler tracks, no extensions, with 4 cylinder LeRoi Engine, in good condition, Price $5,500.00

1—Model 879A Barber-Greene asphalt finisher, s/n: 879A-52-171 on crawlers, with two 1 ft. extensions, with LeRoi 30 h.p. radiator cooled gas engine. In good operating condition. Selling price $6,500.00

All of the above prices are f.o.b. St. Louis, Missouri, and subject to prior sale, and are as is, where is.

For further information write, telephone, or wire:

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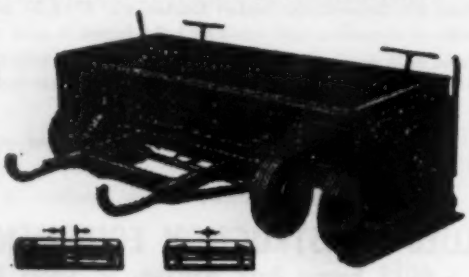

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1—Haiss - Under-Car Unloader. Mod. 501. Serial No. K10737. 600 x 16 tires. Wisc. 4 cyl. Air cooled w/clutch and Rod b/x. NEVER BEEN USED. Sell price: $1,800.

1—D-68 Trailmobile - Tandem flatbed. 26' bed - Full lg. reinforced frame - oak floor. Air brakes. 1000x20 tires, good. Sell price: $3,100.00.

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1055 P&H

Dragline with 100' boom, 3 yd. bucket, Buda 1879 diesel engine, Serial No. 10245. $20,000.00.

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12—30 cu. yd. Mod. MX30 Southwest Bottom Dump Trailers	5,000.00 ea.
10—DW20 Cat Tractors w/30 cu. yd. Mod. PW20 Athey Bottom Dump Trailers	27,000.00 ea.
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Complete Crushing Spread

Consisting of:

30′ x 42″ Pioneer feeder.
32 x 40 Cedarapids jaw crusher.
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1—Lorain 82
2 yd. dragline — hoe — or shovel. Unused government storaged machine. D-13000 Caterpillar engine.

1—Lorain 80
1¾ yd. Same as above, but Waukesha diesel engine.

1—Insley K-12. Unused, with Buda gasoline engine.

18—Lorain Moto-Cranes and self-propelled 7½ tons to 65 tons.

4—½ yd. draglines.

2—Lorain 1 yd. machines.

1—Lorain 1¼ yd., L-56 air controls with shovel available.

1—Buyers ½ yard shovel—very clean.

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1 Donovan Locomotive Boiler, 94 HP, 175 psi working pressure. Fully insulated and portable on pneumatic tires and fifth wheel for movement as semi-trailer.

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1 Hopkins Bros. #402R50 Oil Burner. 400 Gal/Hr. #5 Fuel burning rate. Complete unit with 40 HP Delco Motor, valves, regulators, and pumps. Excellent Condition!

1 Maxon 592 Combination Oil-Gas Burner. Ser. No. 14355-0. Used one season. Burner new in '58. Excellent Condition.

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One HyWay Hot Oil Heater Model 35c- Ser. No. 256576. All pumps and firing equip, included. Good Condition.

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One Barber-Greene 24″ x 60′ stacker conveyor. Style N. Idlers and Belt in good cond. Pneu. tires. Unit in very good operating condition.

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One Buffalo-Springfield 10-12½ Ton 3W Roller. Ser. No. 26158. Gas engine, hyd. steer. Good Condition.

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1 Austin-Western Model 88L Motor Grader, Ser. No. 88L-884. Diesel engine, scarifier, 12′ mold board, 14.00 x 24 - 10 ply tires. Good Condition.

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One Braden winch, Wisc. engine with gear shift transmission. Used as Car Mover.

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1—Lorain 820, 2 yd. crane, dragline and shovel with Cat. Diesel.
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4—Euclid 91FD Rear Dump Trucks with GM 671 Diesels.
1—Euclid S12 Scraper with GM 671 Diesel.
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Four Kolman Stackers used to prepare site of 1960 Winter Olympic Games at Squaw Valley.

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By raising stacker as pile is built, fall of material is kept at a minimum.

MAXIMUM PORTABILITY
Wheel assemblies easily shift from radial arc position to towing position.

BALANCED TOP DRIVE
Design permits heavy electric motors and drives on discharge end .

FINGER-TIP CONTROL
Power Lift and Power Travel lets operator pinpoint stacker discharge.

PNEUMATIC-TIRED STACKERS UP TO 150' LONG

Reports of outstanding performance by the Kolman Model 101-R Radial Stacker are rolling in from all parts of the country. Owners are enthusiastic about bonus features offered by the Kolman Stacker — features like cable suspension of the boom, two-position wheels, balanced electric drive on the head section, power lift, power travel, and cam hinge. Sizes up to 150 feet long build larger stockpiles with a single setting. And they are priced to offer the top value in the field!

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New 25 ton Insley 90' Boom, 30' Sectional Jib, all extras including Folding & Floating High Gantry, Power Load Lowering, Screw Jacks & Floats, at dealers cost F.O.B. Philadelphia. Good rental and recapture deals accepted.

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Used 108 ⅜ yard Bucyrus. Crawler mtd., gas eng. powered, $4,200.

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Pump 8" self priming no engine

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Manhole form 4' conc. pipe style

Electrical Boxes for 10 to 30 Hp. motors 3 phase 440 volts

FOR SALE

5—FDT Euclid Bottom dumps Side boarded to 17 struck

1—671 GMC 75KVA electric set 3/220-440/60 cycle

1—337 Cat 150 KW same

1—1201 Lima crane parts

HOLLAND CONSTRUCTION CO.

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FOR SALE

22-Ton Rear Dumps

5—46 TD

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Caterpillar Graders Model 12—8T Series, D-8, D-7, D-6 Caterpillar pipelayers, D-7—3T Series and 17A series w/angledozers and P.C.U. or Hyster Winches; also 14A and 15A D-8's, Caterpillar 955 and 977 Loaders. Austin Western Hydraulic Cranes—truck mount and self propelled. Caterpillar D-17000 power units, Shovels—1½ yd. to 4 yd. cap—diesel powered, Truck Cranes—20 ton to 35 ton capacity, Crushing plants—complete.

Please advise Make, Model, Serial No., Location and Condition, pictures if possible; also lowest dealer's price.

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H-2682 B5330	Rollers
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1500 FT. -	400 AMP -	ALUMINUM -	3 POLE
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1600 FT. -	800 AMP -	COPPER -	3 POLE
900 FT. -	1000 AMP -	COPPER -	3 POLE
1900 FT. -	400 AMP -	COPPER -	3 POLE
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The Above Duct Will Take Either Bulldog Or Continental Bus Plug In Switches.

1000 Bulldog Plugs For Above In Stock - All Sizes - Surplus Prices.

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4 - 37½ KVA 480/240 - 240/120 G.E. 1 PH.
3 - 25 KVA 480/240 - 240/120 G.E. 1 PH.
1 - 15 KVA 220 - 110 G.E. 1 PH.

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1 - 2000A. 3 Pole, ITE, Elec. Oprd., New.
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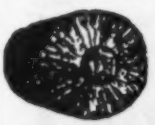

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1—P&H 1055 **dragline.**
1—Worthington 105 cu. ft. **compressor.**
1—22B Bucyrus **shovel.**
1—803 Lima **shovel.**
1—93M Marion **shovel** with $10,000 in parts.
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3—Schram **Rotary drills.**
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1—"D" Roadster **Tournapull.**
3—TL-25J Lorain ¾ yd. & ¾ yd. **Lima.**
2—Hardsog **Horizontal drill.**
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6—**Wagon drills.**
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2—200W **draglines** 7 yd.
1—**Page dragline** 7 yd. & 2- 760B with 17 yd. buckets.
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1—**Low Boy & D-4 tractor.**
2—**Compton-augers** Model 48 & 56.
1—10W, 14 yd. **bucket.**
1—93M Marion **Dragline** 3¼ yd. **bucket.**
1—111M Marion 3½ yd. **shovel.**
1—#362 Marion 2½ yd. **shovel.**
4—**Jack Hammers.**
2—10 ton Galion **rollers.**
1—#1005 Koehring 2½ yd. **shovel.**
1—1201 Lima 3½ yd. **shovel.**
1—20 yd. Garwood **scraper.**

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3—20', 25' & 35' **truck scales.**
2—**set 40 ft. scales** (55,000 lb.)
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1—McNally **pick breakers.**
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1—36x48 **McNally D/Roll.**
2—Bradford **breaker** 7x14' & 9x14'.
2—24x36 **jaw crusher.**
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LATE MODELS—EXCELLENT CONDITION
Manitowoc 2000B, 3000B, 3500, 3900 and 4500.
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10—1955 & 1955 R.D. 205 Internationals with J. T. Cummins Engines with Tag Axles.

4—1954 R.F. 195 Tandems 175" wheel base with 8 to 10 yard dump bodies.

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Model 11 Crawler Mounting, gas power, 10' screed with complete attachments to 14' spreading width. Used only few months—next to new condition.

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EUCLID TC-12 TWIN POWER CRAWLER TRACTORS, 1956 to 1959 Models, all in top operating condition, with tracks from 50 percent to brand new. Available with C-Frame pushers and P.C.U., or fixed push plates. All engines low time or recently overhauled.

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EUCLID Model S-12 SCRAPERS, 12 c.y. struck capacity, stick shift, good 26.5x25 tires. Recently overhauled. General Motors 6-71 diesel power.

EUCLID, 1958, Model S-7 SCRAPER, 7 cu. yd. struck capacity, stick shift, 21.00x25 tires. General Motors diesel power, in top condition.

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10,000 lbs. capacity all steel trailers. 4 wheel construction, with independent front wheel suspension, (front wheels turn for steering). Tongue type draw-bar with eye pintle. Tires are 7.00 x 16 - 6 ply. Each wheel has leaf spring and shock absorber. Trailers are equipped with parking brakes.

Overall length is 10' and trailers are 46" high with the hinged top bonnets closed. Front and rear panels are hinged for access.

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HD-15 Allis-Chalmers Tractors
HD-16 Allis-Chalmers Tractors
HD-19 Allis-Chalmers Tractors
HD-20 Allis-Chalmers Tractors
HD-21 Allis-Chalmers Tractors
D-7 Cat Tractors 3T Series
D-8 Cat Tractors 14A & 36A Series
D-9 Cat Tractors 18A Series
S-7 Euclid Scrapers
S-12 Euclid Scrapers
TS-260 Allis-Chalmers Scrapers
TS-360 Allis-Chalmers Scrapers
DW-21 Cat Scrapers 69C & 86E Series
Model 625 Garwood 25 yd. Pull Scrapers
Model 463 Cat Pull Scraper
MRS Model 250 Tractor-Scrapers

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1—Portable Jet Dredge 10" suction—8" discharge, 27' rotary cutter ladder, 2000' of Armco special pipe, dredge sleeves and 70 pontoons. This dredge is complete and ready to run, and has less than 400 hours of operation.
1—Ensley Crawler Dragline, new in March 1955. Model M with a 30' boom, high gantry, and a Cat 318 "G" diesel, has less than 1,000 hours of operation. $25,500.00.
3—25 ton Euclid End Dumps, Cummins 350 h.p. super charged. $8,500.00 each.
1—L90 Lorain 2½ yd. highlift shovel. Cat 17,000. $11,000.00.
1—Lima std. shovel front for a 1201. Like new.
1—Williams Hammermill 36" x 60". Good condition. $6,500.00.
2—Atlas Imperial Diesel Generator sets, 300 h.p. 250 K.W.—A.C., air start, 3 panel switchboard. 3,000 hours. $12,500.00 each.
5—33 cu. yd. bottom dump trailers with Auto Car chasis, with Cummins 250 h.p. engines. The bottom dump trailers have just been completely rebuilt and have new air operated drop bottoms. The tractors are in good condition. The tires are also in good condition. $10,900.00 each, price.

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MANITOWOC Model 3500 Dragline Attachment, Complete.
BUCYRUS-ERIE Model 54B Hi-Front Shovel. Attractive Figure.
INSLEY Backhoes—1955 Model K, ½ Yd., Rebuilt & Guar. 1953 Model L, ¾ Yd. Cat. Diesel, A-1.
EUCLID S7—7 Yd. & S18—21 Yd. Scrapers. Also S7 Rock Wagon in like new condition. Rent or sell.
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Blaw-Knox Batch Plant complete Model P 3100 GAC Portable 3 Compartment Aggregate and Cement Bin, 33 BR Batcher, C 3 B Batcher, BCPC - 200 Hi Bin and 400 Lo Bin, Electric Bin Signal, 200 Gal. Water weighing Batcher, 50 T.P.H. cement Elevator, 50 T.P.H. cement car unloading undertrack screw and truck loading elevator.
Dorsey - Model TAT 25 Tilt-to-Load Trailor, 12½ Ton Capacity with 1956 Ford F-600 Tractor Dump Truck.
Traxcavator D4 - HT4 serial number 7 U 33344 with Ottawa Backhoe and accessory fork lift.
Material Elevators, metal scaffolding, metal adjustable shores, generators, concrete vibrators, motorized buggies, troweling machines, concrete buckets, masonry saw, table saws, compactors and miscellaneous contractors small hand and power tools.

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DES MOINES, IOWA

New Products

Continued from page 182

to be highly resistant to solvents—swelling but not dissolving. They can be used in fairly severe acid and caustic environments. Adhesion is related to built-in residual tack. The area exposed to air will lose tack but the inner mass and the interface areas retain tack. This not only keeps the bond intact but produces self-sealing characteristics.

Dittrenner Associates, Inc., 18 Oneida Ave., Rockaway, N.J.

For more details circle 153 on Enclosed Return Postal Card.

Oil Condition Indicator

For engine users seeking lowered operating costs the Gerin Oil Condition Indicator Model G for gasoline engines will be of interest. The manufacturer is Gerin Corp., of Avon.

The oil condition indicator is a gauge-type meter which shows when the crankcase oil is affected by fuel dilution, dead filters, wrong grade make-up oil, leakage of water or antifreeze. It can be read at a glance with the engine running or stopped. The device tells the reader when oil is perfectly good for further use, thereby avoiding needless oil changes. It also signals engine conditions which contaminate the oil and lead to fast wear.

Gerin Corp., Avon, New Jersey

For more details circle 154 on Enclosed Return Postal Card.

Blasting Machines

Two new blasting machines are now offered by Vibration Measurement Engineers, Inc. These machines incorporate several features in high capacity condenser-discharge blasting machines.

The VME-Sr. is a 450 volt rated blasting machine which

VME Blasting Machines

weighs 15 lb. and has a recommended capacity of 50 caps in straight series for primary blasts and 200 caps in straight series for secondary blasts. Fifty caps can be shot in straight-parallel and 1200 in series parallel.

The VME-Jr. is rated at 225 volts is 30 caps in straight series for primary blasts and 100 caps in straight series for secondary blasts. In series parallel 240 caps can be shot.

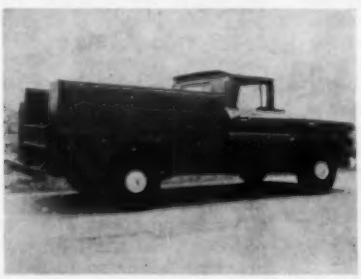
Vibration Measurement Engineers, Inc., 725 Oakton St., Evanston, Ill.

For more details circle 157 on Enclosed Return Postal Card.

Service Body Line

A complete new line of general service bodies, conversion kits and side boxes for use on ½, ¾ and 1 ton pickup truck chassis have been introduced by the Utility Div. of Highway Trailer Industries, Inc.

The Highway general service body line is designed for universal application in utility construction and maintenance



Highway Trailer's General Bodyline

and the contracting trade. They are available for all popular makes of trucks, including those with dual rear tires. The model HB general service body is constructed of rust-proof galvaneal steel. Wheel wells are undercoated for additional protection. Inside floor space is 48½ in. wide, with lengths of 75 to 104 in., depending on chassis. Overall width is 77½ in.; height is 42 in., and 29 in. from floor to top. Side boxes are 14½ in. deep.

General service bodies have hinged tail gate with chain and hooks for positions and locking. Sliding type roof can be furnished as an option. Units can be shipped knocked-down for shipment and assembled in the field with no difficulty, states the manufacturer.

Highway Trailer Industries, Inc., 250 Park Ave., New York 17, N.Y.

For more details circle 158 on Enclosed Return Postal Card.

New Utility Light

A new economical utility light is being manufactured by Electronic Specialties Co.

Constructed to provide shock-proof operation under all-weather conditions, the new Esco Flare utility light operates on 18 volts, has no moving parts or relays. The new device is equipped with a wide-beam optical lens, parabolic re-

Electronic's Utility Light

flector with Alzac finish, power pulsator with selector transistors. An on-off switch operates light and battery meter and a collapsible stand extends to 8 ft.

The new transistorized utility light is adaptable to the requirements of road builders, utility companies and municipalities.

Electronic Specialties Co., Batavia, Ill.

For more details circle 159 on Enclosed Return Postal Card.

DON'T THROW AWAY CRACKED DIESEL CYLINDER HEADS
You can save 50% of replacement cost with Factory Rebuilt Swick-Guth Heads. Swick-Guth restores cracked or worn heads, blocks, transmission cases to a Guaranteed good as new condition by the Controlled Heat Process . . . successfully used for more than a Quarter Century.
GUARANTEED TO YOUR SATISFACTION
BEFORE
AFTER
Send today for price list and a free booklet on the famous Swick-Guth Process, and the name of the dealer nearest you.
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"SPECIALISTS IN WELDING DIESEL CASTINGS"

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File constructed in 200 lbs. test corrugated container.

9 TUBE MODEL Tube I. D. 4⅛"			
MODEL NUMBER	0930	0936	0942
Size 13½x13½xL	31	37	43
Inside depth	30½	36½	42½
Price	$11.50	$12.00	$12.50

16 TUBE MODEL Tube I. D. 3⅛"			
MODEL NUMBER	1630	1636	1642
Size 13½x13½xL	31	37	43
Inside depth	30½	36½	42½
Price	$12.00	$12.50	$13.00

Color Med. Gray • F.O.B. St. Clair Shores, Mich.
SOLD DIRECT ONLY
25 and 49 Tube model avail. Write for brochure.

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. . . for more details circle 314 on enclosed return postal card.

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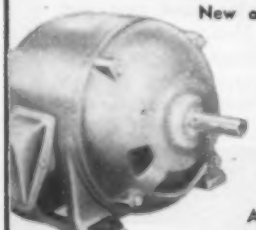

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Over 10,000 pieces of electrical equipment in stock . . . these are samples of the low prices of our equipment and stock .

3—100 HP - 1200 RPM-TEFC Motors—440-60-3 . . Rebuilt. Reg. $4668.00 ea. **OUR PRICE $1618.00 ea.**

15—3 HP-40 RPM-totally enclosed parallel gear-motors, Rebuilt. Reg. $1023.00 ea. **OUR PRICE $325.00 ea.**

WIRE - WRITE . . CALL COLLECT ALPINE 5-5481

WEAVER ELECTRIC CO.
1721 Larimer St. - Est. 1910 - Denver, Colo.

. . . for more details circle 359 on enclosed return postal card

Manufacturers' Literature

ARC WELDING: A new 24 pg. booklet published by Hobart Arc Welding News, AWN-165, shows interesting photographs and contains some informative articles on welding from about the country. The booklet is being made available by Hobart Brothers, Co., Troy, Ohio.

For more details circle 160 on Enclosed Return Postal Card.

TILT BED TRAILERS: New literature on a line of tilt bed trailers has been published by Rogers Brothers Corp., Albion, Pa.

Covered are models ranging in capacity from 6 to 25 tons and include single and double axle trailer designs, many with special innovations and construction features.

For more details circle 161 on Enclosed Return Postal Card.

HYDRAULIC CYLINDERS: Described in 3 new bulletins released by Mo-Bar Hydraulics Co., Crystal Lake, Ill. are hydraulic cylinders with several advance design ideas.

Among the featured attractions is the use of 4 Allen Head cap screws in place of conventional protruding hex nuts. Quick replacement of the entire cylinder rod cartridge assembly is accomplished with cylinder barrel and tie rods always permanently in place.

For more details circle 162 on Enclosed Return Postal Card.

DIESEL ENGINES: Features of the recently introduced Allis-Chalmers Models 1000 and 11000 diesel engines are described by illustrations and text of the new two-color, 8 pg. catalog now available from Allis Chalmers Mfg. Co., Engine-Material Handling Div., Milwaukee, Wis. Performance curves and charts, and illustrations, including cutaways of important components, are included to explain "A New Kind of Diesel Work Power" provided by these two new engines in the 100 to 210 hp. class.

For more details circle 163 on Enclosed Return Postal Card.

MERCURY-LAMP: Mercury-lamp technical information is contained in a new 28 pg. booklet now available from the Westinghouse Lamp Div., MacArthur Ave., Bloomfield, N.J.

The publication contains the latest information about initial and maintained lumen output; life ratings and essential electrical and physical characteristics of the Westinghouse mercury lamps. In addition, it describes lamp construction, ASA designations, color, auxiliary equipment and application information.

For more details circle 164 on Enclosed Return Postal Card.

FRICTION MATERIALS: A new 80 pg. catalog by American Brake Shoe Co., 530 Fifth Ave., New York 36, N.Y., lists braking and other friction materials for power shovels, hoists, graders and take-off units. Organic and sintered metallic materials are included for every type of clutch and brake application.

Manufacturers' index facilitates quick location of proper specifications for parts on equipment of all makes. Cross index by brake lining size is provided.

For more details circle 165 on Enclosed Return Postal Card.

ASPHALT FINISHERS: A new 4 pg. bulletin describing asphalt finishers has been announced by the Barber-Greene Co., Aurora, Ill.

The company calls their new Model SA-40 a new achievement in ease of operation and automatic features, which are combined with simple construction for greater accessibility and ease of maintenance.

Paving speeds range from 100 fpm. to travel speeds of 4 mph. Five models are offered in compact, general duty and heavy-duty types. Operation is made simpler by use of the "joystick", power-assist steering and self-dumping hopper.

For more details circle 166 on Enclosed Return Postal Card.

STREET FLUSHERS: A new 6 pg. bulletin covering all the body styles of the Etnyre street flushers is available from E. D. Etnyre & Co., Oregon, Ill.

Included in the bulletin are standard equipment specifications with detailed descriptions of the most important features. Optional equipment is also listed.

For more details circle 167 on Enclosed Return Postal Card.

COMPACT CRAWLERS: Utility applications of the new Allis-Chalmers H-3 and HD-3 compact crawler tractors are pictorially described in a new catalog now available from that company's Utility Tractor Department, Milwaukee 1, Wis.

Also included is illustrated information covering engineering, design and construction features along with data on its gasoline or diesel plants.

For more details circle 168 on Enclosed Return Postal Card.

CONCRETE EQUIPMENT: A new 28 pg. catalog covering Stow concrete equipment has been printed by Stow Mfg. Co., 443 State St., Binghamton, N.Y.

The booklet covers vibrators, tampers and gang paving vibrators.

For more details circle 169 on Enclosed Return Postal Card.

With The Manufacturers

PRESTRESSED CONCRETE: The unlimited applications for high quality prestressed concrete are described in 16 studies of outstanding prestressed concrete projects in a 20 pg. publication from Master Builders Co., Cleveland 3, Ohio.

A 2 million gal. prestresed water tank is one of the outstanding features.

ASBESTOS-ASPHALT PAVING: A specially milled asbaltic asbestos fiber, which has been utilized in numerous field test strips of asbestos-asphalt paving has been introduced in a new brochure, published by Johns-Manville. The bulletin also contains data on the advantages and applications of this new type of paving, which also has been widely used in asbestors-asphalt curbing.

Included in the 4 pg. brochure are benefits demonstrated through actual application of J-M Asbaltic to asbestos-asphalt paving. Those included are; increased resistance to deformation, greater impact strength and reduced paving thickness.

TRACTOR-SCRAPER TEAM: Engineering and design details which are said to make the Cat 619B-442 tractor-scraper team a top producer are discussed in a 12 pg. booklet just issued by Caterpilar Tractor Co., Peoria, Ill.

Power, speed, safety and roadability, easy servicing and loading characteristics are discussed in detail for the contractor interested in knowing the inside story of his equipment.

WELDING TORCHES: A new 8 pg. booklet available from Linde Co., Div. of Union Carbide Corp., 270 Park Ave., New York 17, N.Y. discusses the Oxweld W-45 and W-47 welding torches said to be capable of welding any metal thickness from 29 gage sheet to heavy plate. Featured is the ability to handle gas flows as low as 2 cu. ft. per hr. for precision welding, or total flows as high as 1500 cu. ft. per hr. for heavy heating operation.

Handy cutting attachments that convert the torches to flame-cutting on all metal thicknesses up to 8 in. are also described.

TECHNICAL PORTFOLIO: A comprehensive, 16 pg. technical portfolio showing features and capabilities of the recently announced P&H Model 255 B-TC truck crane is now available from the Harnischfeger Corp., Milwaukee 46, Wis.

The literature includes information on Harnischfeger's exclusive Power Box design, complete specifications of each front end attachment and tables showing axle loadings with each length crane boom available for the unit.

MATERIALS HANDLER: Design features of the Caterpillar 922 Series A Traxcavator which make it top produced in materials handling work are detailed in a 12 pg. booklet released by Caterpilar Tractor Co., Peoria, Ill.

The engineering details which are reported to asure quick response performance, operator safety and convenience, greater ease of servicing and versatility are described at length in the booklet.

MINNEAPOLIS-MOLINE CO.: A new division has been formed in the Minneapolis-Moline Co. Under the direction of M. E. Carroll, v. p. in charge of marketing, R. R. Hipwell has been appointed manager of the Moline Automotive Div. and George W. Balch has been named sales engineer. Hipwell was formerly manager of industrial sales. The new division will have a full line of gasoline, LP gas, diesel and natural gas engines and related parts and machinery.

INLAND STEEL: Grederick G. Jaicks has been named vice president of Inland Steel Co. He will continue in this capacity as general manager and also assume the responsibilities of vice president of steel manufacturing.

Jaicks has been with Inland since 1940 except during WW II, during which time he served as a naval officer and aviator.

LINK-BELT: Erwin A. Wendell has been appointed manager of advertising and public relations for Link-Belt Co., with headquarters at the company's executive offices in Chicago.

The appointment follows the retirement of Bertram V. Jones, ad man for the past ten years and a member of the department since 1923. Mr. Wendell joined the company's engineering department at the Pershing Rd. plant in Chicago in 1917.

BUCYRUS-ERIE: Lewis C. Black, vice-president in charge of sales for Bucyrus-Erie Co. was recently elected president of the Power Crane and Shovel Association.

A member of the Association's board of directors last year, Black will serve in his new post for one year.

CIMA: The 4th all day meeting of the CIMA service management council was held recently in Chicago. This group, sponsored by the Construction Manufacturers Association is comprised of Service Managers from 127 construction equipment manufacturers. The next meeting will be March 23, '61.

BALDWIN-LIMA-HAMILTON: After 40 years of service in the industrial advertising field, Roy K. Wills has retired, effective Dec. 31 of last year. Of those years, 32 of them were spent as Ad Manager for Baldwin-Lima-Hamilton Corp. During WW I Wills served with the 84th Div. in Europe. He got his start in advertising work while still in high school.

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and NEW TOWER California's World-Famous Resort overlooking the Blue Pacific where Wilshire meets the sea. Twenty minutes from International Airport. 450 luxurious rooms and bungalows, all with television and radio. Complete convention facilities. Banquet rooms for up to 2,000, air-conditioned. Exciting new Venetian Room and Cantonese Room. Swimming pool Beautiful grounds and landscaped gardens. Rates from $8.

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CREST OF GOOD LIVING
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- LONG BEACH, CALIF. Hotel Wilton
- GALLUP, N.M. Hotel El Rancho
- ALBUQUERQUE, Hotel Franciscan
- DENVER, COLO. Hotel Park Lane
- WASHINGTON, D.C. Hotel Raleigh
- HARTFORD, CONN. Hotel Bond
- PITTSBURGH, PA. Hotel Sherwyn
- CINCINNATI, O. Hotel Sinton
- HONOLULU Hotel Waikiki Biltmore

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Teletype service—Family Plan

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Overlooking Lake Michigan and Belmont Yacht Harbor. 12 minutes from the loop—direct busses at the door. Spacious parking. New Banquet and Meeting rooms accommodate up to 400 persons.
Charming, new Mansion House Dining Room and unique Cocktail Room—The Dam Site.

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Full Hotel Services
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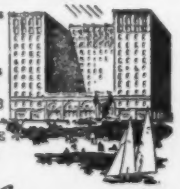

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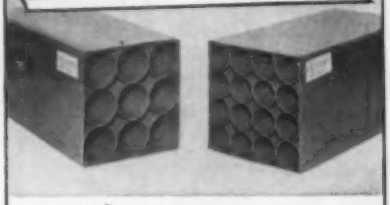
MULTIROLL FILES



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Inside depth	30½	36½	42½
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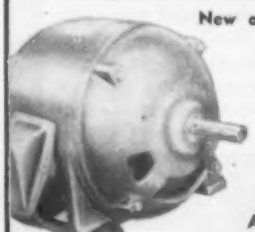

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Manufacturers' Literature

ARC WELDING: A new 24 pg. booklet published by Hobart Arc Welding News, AWN-165, shows interesting photographs and contains some informative articles on welding from about the country. The booklet is being made available by Hobart Brothers, Co., Troy, Ohio.

For more details circle 160 on Enclosed Return Postal Card.

TILT BED TRAILERS: New literature on a line of tilt bed trailers has been published by Rogers Brothers Corp., Albion, Pa.

Covered are models ranging in capacity from 6 to 25 tons and include single and double axle trailer designs, many with special innovations and construction features.

For more details circle 161 on Enclosed Return Postal Card.

HYDRAULIC CYLINDERS: Described in 3 new bulletins released by Mo-Bar Hydraulics Co., Crystal Lake, Ill. are hydraulic cylinders with several advance design ideas.

Among the featured attractions is the use of 4 Allen Head cap screws in place of conventional protruding hex nuts. Quick replacement of the entire cylinder rod cartridge assembly is accomplished with cylinder barrel and tie rods always permanently in place.

For more details circle 162 on Enclosed Return Postal Card.

DIESEL ENGINES: Features of the recently introduced Allis-Chalmers Models 1000 and 11000 diesel engines are described by illustrations and text of the new two-color, 8 pg. catalog now available from Allis Chalmers Mfg. Co., Engine-Material Handling Div., Milwaukee, Wis. Performance curves and charts, and illustrations, including cutaways of important components, are included to explain "A New Kind of Diesel Work Power" provided by these two new engines in the 100 to 210 hp. class.

For more details circle 163 on Enclosed Return Postal Card.

MERCURY-LAMP: Mercury-lamp technical information is contained in a new 28 pg. booklet now available from the Westinghouse Lamp Div., MacArthur Ave., Bloomfield, N.J.

The publication contains the latest information about initial and maintained lumen output; life ratings and essential electrical and physical characteristics of the Westinghouse mercury lamps. In addition, it describes lamp construction, ASA designations, color, auxiliary equipment and application information.

For more details circle 164 on Enclosed Return Postal Card.

FRICTION MATERIALS: A new 80 pg. catalog by American Brake Shoe Co., 530 Fifth Ave., New York 36, N.Y., lists braking and other friction materials for power shovels, hoists, graders and take-off units. Organic and sintered metallic materials are included for every type of clutch and brake application.

Manufacturers' index facilitates quick location of proper specifications for parts on equipment of all makes. Cross index by brake lining size is provided.

For more details circle 165 on Enclosed Return Postal Card.

ASPHALT FINISHERS: A new 4 pg. bulletin describing asphalt finishers has been announced by the Barber-Greene Co., Aurora, Ill.

The company calls their new Model SA-40 a new achievement in ease of operation and automatic features, which are combined with simple construction for greater accessibility and ease of maintenance.

Paving speeds range from 100 fpm. to travel speeds of 4 mph. Five models are offered in compact, general duty and heavy-duty types. Operation is made simpler by use of the "joystick", power-assist steering and self-dumping hopper.

For more details circle 166 on Enclosed Return Postal Card.

STREET FLUSHERS: A new 6 pg. bulletin covering all the body styles of the Etnyre street flushers is available from E. D. Etnyre & Co., Oregon, Ill.

Included in the bulletin are standard equipment specifications with detailed descriptions of the most important features. Optional equipment is also listed.

For more details circle 167 on Enclosed Return Postal Card.

COMPACT CRAWLERS: Utility applications of the new Allis-Chalmers H-3 and HD-3 compact crawler tractors are pictorially described in a new catalog now available from that company's Utility Tractor Department, Milwaukee 1, Wis.

Also included is illustrated information covering engineering, design and construction features along with data on its gasoline or diesel plants.

For more details circle 168 on Enclosed Return Postal Card.

CONCRETE EQUIPMENT: A new 28 pg. catalog covering Stow concrete equipment has been printed by Stow Mfg. Co., 443 State St., Binghamton, N.Y.

The booklet covers vibrators, tampers and gang paving vibrators.

For more details circle 169 on Enclosed Return Postal Card.

With The Manufacturers

PRESTRESSED CONCRETE: The unlimited applications for high quality prestressed concrete are described in 16 studies of outstanding prestressed concrete projects in a 20 pg. publication from Master Builders Co., Cleveland 3, Ohio.

A 2 million gal. prestresed water tank is one of the outstanding features.

ASBESTOS-ASPHALT PAVING: A specially milled asbaltic asbestos fiber, which has been utilized in numerous field test strips of asbestos-asphalt paving has been introduced in a new brochure, published by Johns-Manville. The bulletin also contains data on the advantages and applications of this new type of paving, which also has been widely used in asbestors-asphalt curbing.

Included in the 4 pg. brochure are benefits demonstrated through actual application of J-M Asbaltic to asbestos-asphalt paving. Those included are; increased resistance to deformation, greater impact strength and reduced paving thickness.

TRACTOR-SCRAPER TEAM: Engineering and design details which are said to make the Cat 619B-442 tractor-scraper team a top producer are discussed in a 12 pg. booklet just issued by Caterpilar Tractor Co., Peoria, Ill.

Power, speed, safety and roadability, easy servicing and loading characteristics are discussed in detail for the contractor interested in knowing the inside story of his equipment.

WELDING TORCHES: A new 8 pg. booklet available from Linde Co., Div. of Union Carbide Corp., 270 Park Ave., New York 17, N.Y. discusses the Ox-weld W-45 and W-47 welding torches said to be capable of welding any metal thickness from 29 gage sheet to heavy plate. Featured is the ability to handle gas flows as low as 2 cu. ft. per hr. for precision welding, or total flows as high as 1500 cu. ft. per hr. for heavy heating operation.

Handy cutting attachments that convert the torches to flame-cutting on all metal thicknesses up to 8 in. are also described.

TECHNICAL PORTFOLIO: A comprehensive, 16 pg. technical portfolio showing features and capabilities of the recently announced P&H Model 255 B-TC truck crane is now available from the Harnischfeger Corp., Milwaukee 46, Wis.

The literature includes information on Harnischfeger's exclusive Power Box design, complete specifications of each front end attachment and tables showing axle loadings with each length crane boom available for the unit.

MATERIALS HANDLER: Design features of the Caterpillar 922 Series A Traxcavator which make it top produced in materials handling work are detailed in a 12 pg. booklet released by Caterpilar Tractor Co., Peoria, Ill.

The engineering details which are reported to asure quick response performance, operator safety and convenience, greater ease of servicing and versatility are described at length in the booklet.

MINNEAPOLIS-MOLINE CO.: A new division has been formed in the Minneapolis-Moline Co. Under the direction of M. E. Carroll, v. p. in charge of marketing, R. R. Hipwell has been appointed manager of the Moline Automotive Div. and George W. Balch has been named sales engineer. Hipwell was formerly manager of industrial sales. The new division will have a full line of gasoline, LP gas, diesel and natural gas engines and related parts and machinery.

INLAND STEEL: Grederick G. Jaicks has been named vice president of Inland Steel Co. He will continue in this capacity as general manager and also assume the responsibilities of vice president of steel manufacturing.

Jaicks has been with Inland since 1940 except during WW II, during which time he served as a naval officer and aviator.

LINK-BELT: Erwin A. Wendell has been appointed manager of advertising and public relations for Link-Belt Co., with headquarters at the company's executive offices in Chicago.

The appointment follows the retirement of Bertram V. Jones, ad man for the past ten years and a member of the department since 1923. Mr. Wendell joined the company's engineering department at the Pershing Rd. plant in Chicago in 1917.

BUCYRUS-ERIE: Lewis C. Black, vice-president in charge of sales for Bucyrus-Erie Co. was recently elected president of the Power Crane and Shovel Association.

A member of the Association's board of directors last year, Black will serve in his new post for one year.

CIMA: The 4th all day meeting of the CIMA service management council was held recently in Chicago. This group, sponsored by the Construction Manufacturers Association is comprised of Service Managers from 127 construction equipment manufacturers. The next meeting will be March 23, '61.

BALDWIN-LIMA-HAMILTON: After 40 years of service in the industrial advertising field, Roy K. Wills has retired, effective Dec. 31 of last year. Of those years, 32 of them were spent as Ad Manager for Baldwin-Lima-Hamilton Corp. During WW I Wills served with the 84th Div. in Europe. He got his start in advertising work while still in high school.

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and NEW TOWER California's World-Famous Resort overlooking the Blue Pacific where Wilshire meets the sea. Twenty minutes from International Airport. 450 luxurious rooms and bungalows, all with television and radio. Complete convention facilities. Banquet rooms for up to 2,000, air-conditioned. Exciting new Venetian Room and Cantonese Room. Swimming pool Beautiful grounds and landscaped gardens. Rates from $8.

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Index to Advertisers

Acme Iron Works 182
Adams Machinery Inc. 194
Allied Construction Equipment Company 183, 192
Allied Materials Corp. 27
Allis-Chalmers .....80 & 81
Alpha Portland Cement Company...175
American Machine & Tool Company.164
American-Marietta 37
American Steel & Wire Division of United States Steel.....100 & 101
Anderson Equipment Company 194
Armstrong Co. 184
Axelson Equipt. Corp. 187

Backmeier, Ed. 194
Baker, Peter, & Son 186
Bama Sales Company 188
Barber-Greene Company.....142 & 143
Beasley, Miller C., Machinery Co....186
Beebe Bros. 180
Beemsterboer, Sam 188
Bernstein Bros. 191
Bethlehem Steel Company...3, 16 & 17
Blaw-Knox Company .....76 & 77
Boers, Gil, Equip. Company 185
Browning Manufacturing Co. 6
Butler Bin Company 36

Carlson, Fred, Company Inc. 185
Caterpillar Tractor Co. 53, 54, 55, 56, 57, 58, 59, 60
Central Mix Concrete 184
Central-Reynolds Company, The 7
Chadwick-BaRoss Inc. 191
Chain Belt Company 66
Childers Manufacturing Company, Inc. 26
Chapin Cylinder Head Co. 190
Chase Engineering Co. 184
Clark Equipment Company—Construction Machinery Division .....112 & 113
Cline, F. D., Paving Co. 190
Clipper Manufacturing Co. 33
Cohen, Leopold, Iron Co. 188
Colorado Builders' Supply Company, The 192
Colorado Fuel and Iron Corporation, The .....170 & 171
Columbia-Geneva Steel Division of United States Steel .....100 & 101
Columbia Southern Chemicals 167
Craig, Jay W., Company 184

Dallas Brush Manufacturing Co. 191
Deere, John .....84 & 85
Dockery Machinery Sales, Inc. 185
Dotmar Industries Inc. 152

Eighmy Equipment Company 189
Eimco Corporation, The 159
Equipment Corporation of America..190
Essick Manufacturing Company 34
Etnyre, E. D., & Co. 145
EUCLID Division, General Motors Corporation .....22 & 23, 118 & 119
Euclid Div. G.M.C. Iron Range Branch 187
Euclid Sales and Service Inc. 190

Famalette, Frank, Equipment Co. ...184
Fehrs Tractor & Equipment Co. 192, 194
Firestone Tire & Rubber Company.. 18
Fish, Charles V., Co., Inc. 186
Fishel, Bill 187
Fobes, R. Wayne 184
Ford Motor Company, Industrial Engine Department 44
Ford Motor Company, Tractor and Implement Division 151
Ford Motor Company, Truck Division 28, 29, 30, 31
Foster, L. B., Co. 192
French, James C. 190, 193
Fuller Transmission Division, Eaton Manufacturing Company... 43
Fund Insurance Companies, The.... 42
Funk Mfg. Co. 146

Gallagher Asphalt Corporation 186
General Equip. Co. 190
General Motors Corporation (Allison Division) 189
General Motors Corporation, Chevrolet Motor Division...106 & 107
General Motors Corporation, EUCLID Division..22 & 23, 118 & 119
Getz Tires, Inc. 189
Gill Equipment Co. 190
Globe Electronics 165
Golden Gate Equipment 188
Good Roads Machinery Corporation.164
Goodyear Tire & Rubber Company, The 5
Gregory-Poole Equip. Co. 188

Hanson Machinery Co. 102
Head & Guild Equipment Co., Inc...186
Hedge & Mattheis Co. 193
Henault, P. A. 189
Highway Equipment Company 69
Hofing Truck Sales 190
Holland Construction Co. 187
Hotel Belmont 197
Hotels Massaglia 197
Huber-Warco Company 73
Hyman-Michaels Company 191
Hyster Company—Tractor Equipment Division .....70 & 71

Illinois Machinery Company 192
Ingersoll-Rand Company 32
International Harvester Company, Construction Equipment Division .....64 & 65, 88 & 89
International Harvester Company, Farm Equipment Division .....Third Cover
International Harvester Company, Motor Truck Division.....14 & 15

Jackson Vibrators, Inc.....Second Cover
Jaeger Machine Company, The 153
James Construction Co. 192
Jay Company Division, J. Leukart Machine Co., Inc. 178
Johns-Manville 123

Kano Laboratories 158
Kelsey Tire Co. 192
Kennedy's Van Brush Mfg. Co. 182
Kent Piling Co. Inc. 193
Kind, Morton J. 190
King Brothers Auction Co. 194
Koehring Company—Buffalo-Springfield Division .....12 & 13
Koehring Company, Flaherty Department 24
Koehring Company—C. S. Johnson Division 21
Koehring Company—Koehring Division 35
Kolman Manufacturing Co. 187
Kotal Company 158
KTV Towers and Communication Equip. Co. 191

Laclede Steel Company 124
Lake City Iron & Metal Corp. 193
Land, L. J., Inc. 194
LeTourneau-Westinghouse Company .....38 & 39, 41
Lindekugel, G. H., & Sons 189
Littleford Bros., Inc. .....93 & 94
Lubrecht, William III, Construction Equipment 190
Lubrication Engineers Inc. 179

McConnaughay, K. E. .....140 & 141
McElroy Transport Co. 192
Mack Trucks Inc. .....156 & 157
Madsen Works—Construction Equipment Division, Baldwin-Lima-Hamilton Corporation .....148 & 149
Maginnis Power Tool Company.....176
Maintenance Inc. 181
Manganese Steel Parts Division 183
Manitowoc Engineering Corp. 95
Metro Equipment Corp. 191
Midway Supply Company 183
Mine Equipment & Supply Co. 193
Mississippi Valley Equipment Co. ...188
Motorola Communications & Electronics, Inc. 161
Mutual Truck Parts Co. Inc. 193

National Lime Association 25
National Schools of Construction, Inc. 186
Neenah Foundry Company 172
Northwest Schools 172

Overman, I. J., Manufacturing Co...178
Owen Bucket Company 87

Pittsburgh Steel Company....162 & 163
Plastic Sealer Corporation 166

Republic Steel Corporation—Truscon Division 139
Rhian, A. J. 193
Rock Drillers Supply Company Inc..190
Roll & File Systems, Inc. 196
Ryan Co., The George T. 190

Salinger Electric Co. Inc. 188
Smith, Charles 193
Smith Company, The T. L. 127, 129, 131, 133, 135
Standard Steel Corporation.....10 & 11
Swick-Guth Co. 195
Symons Clamp & Mfg. Co. 173

Tarrant Mfg. Company 146
Tennessee Coal & Iron Division of United States Steel .....100 & 101
Texaco Inc.—Asphalt Sales Division..155
Texaco Inc.—Lubrication Division..8 & 9
Timken Roller Bearing Company .....Fourth Cover
Trinity Dam Contractors 185
Troyer, Stanley B., Equipment Co...186

Udelson Equipment Co. 191
United Equipment Co. 194
United States Steel Export Company .....100 & 101
United States Steel Corporation .....100 & 101

Vandeventer Auto Sales 187
Veterans' Excavating Company, Inc. 188

Wagstaff, H. R., Co. 189
Warren Manufacturing Co. 184
Weaver Electric Co. 196
Weirton Steel Company, Division of National Steel Corporation 114
Wenzel Machy. Co. 191
Wenzel Machinery Rental & Sales Co., Inc. 189
Western Services Corporation 184
Westport Machinery Company, The.187
Wheel Trueing Tool Company 40
Williams Mfg. Co., Hugh B. 111
Winer, Sam, Motors, Inc. 184

Yale & Towne Manufacturing Company 168

The T-340 has the capacity to handle stockpiling and clean-up work. Big 85-inch blade with 32-inch spillboard holds the heap. Operator changes the angle or tilt of the hydraulic Bullgrader® *on-the-go* without ever leaving the tractor seat.

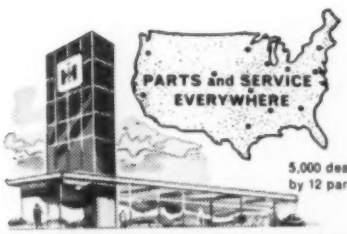
You'd never expect to do so much with an "under 50 hp" crawler!

Even under the most adverse conditions the 47 hp* International® T-340 crawler is a heavy producer. More than three tons of drawbar pull or push are balanced with long track length for excellent traction and flotation in the worst footing.

Handling ease with exclusive planetary steering helps the T-340 near the production of larger crawlers costing thousands of dollars more. Optional Fast Reverser almost eliminates gear shifting and slashes cycle time on shuttle-type work.

Ask your nearby IH dealer to demonstrate an International T-340 on your next job. You'll be surprised—and pleased—at how much work this rugged 47 hp go-getter will do.

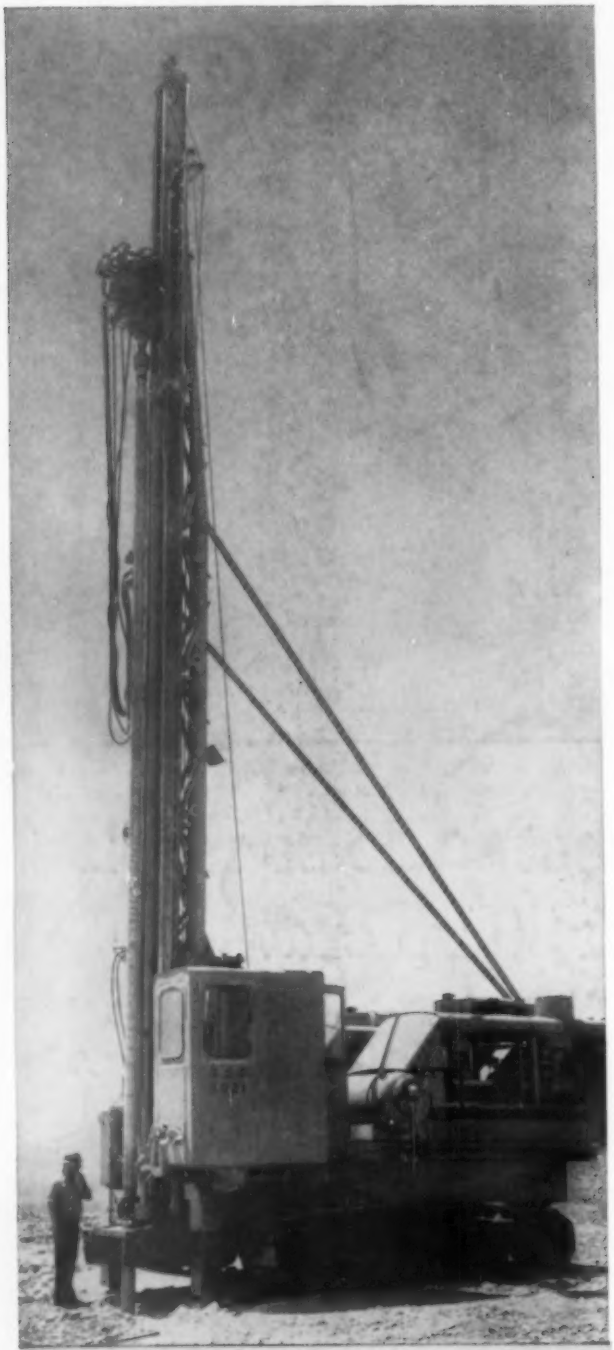
**Maximum engine horsepower at standard conditions*

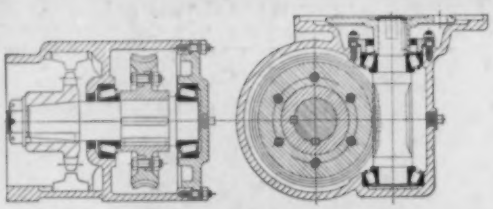


INTERNATIONAL HARVESTER

Cut through stubborn clay or sticky gumbo with non-spin traction. In any material the T-340 gets heaping loads quickly in cycle-speeding second and third gear ranges at 2.2 to 3 mph.

Precision grading ability of the T-340 helped slash stadium construction costs at the new Charlotte, N. C., stock car speedway. The IH crawler graded for 50,000 stadium seats.





How Timken bearings are used on the worm drive in Ingersoll-Rand's QM-3-DHD-400 "Quarrymaster" —to take heaviest loads, cut maintenance.

. . . for more details circle 356 on enclosed return postal card

How Ingersoll-Rand assures accuracy of "Quarrymaster's" drill feed under 900-blow-per-minute drilling

STRIKING 900 blows per minute and drilling through all kinds of hard broken rock formations puts terrific loads on the air motor that feeds the "Quarrymaster" drill. Yet the motor assures accurate, positive control of drill feed; fights a tight steel when drilling broken and seamy ground. One big reason the motor works so dependably is that the worm gear is mounted on Timken® tapered roller bearings. Ingersoll-Rand selected Timken bearings because . . .

1. *They take all loads.* The tapered design of Timken bearings enables them to take *any* combination of radial and thrust loads. And full line contact between rollers and races gives Timken bearings *extra* load-carrying capacity—to take heavy shock loads.

2. *They reduce maintenance, last longer.* Because they hold shafts concentric with their housings, Timken bearings make closures more effective in keeping dirt and moisture out, lubricant in, maintenance down. Bearings and parts last longer.

And Timken bearing-equipped machines give you the extra advantages of Timken Company leadership in tapered roller bearing design plus service from graduate engineer salesmen. Backing this leadership are the most modern testing, research and development facilities in the bearing industry.

When you buy Timken bearings you get . . . *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloys Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ontario.

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